INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES

YGL BULLETIN NO.17

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UNITED STATES

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ONTARIO MINISTRY OF THE ENVIRONMENT

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CONTENTS

CANADA AND UNITED STATES

FINAL IFYGL WORKSHOP

The IFYGL "Wrap-Up" Workshop will be held on October 2, 3 and 4, 1977, in the Geneva Park Conference Centre in Huronia, Canada. Panel members will be invited to participate in this critical review of the IFYGL program.

IFYGL BULLETIN ARTICLES

It is requested that scientists who are or have been conducting studies using IFYGL data submit summary articles for inclusion in the IFYGL Bulletin. The purpose of the Bulletin is to provide documentation of the IFYGL program in all its aspects and to facilitate distribution of information to all interested parties. Results of analysis of IFYGL data being made available will increase the value of the IFYGL data archives and be of help to scientists undertaking further studies based on these and other Lake Ontario data.

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A joint Canadian-United States list of publications related to IFYGL was included in IFYGL Bulletin No. 13, and will appear, cumulatively, in all subsequent issues. Additions will be identified as such in each Bulletin. Any questions, comments, or additions to the bibliography should be addressed to one of the IFYGL Coordinators as follows:

Mr. R. J. Mills
Canadian IFYGL Coordinator-ACHC
Atmospheric Environment Service
Environment Canada
4905 Dufferin Street
Downsview, Ontario M3H 5T4

Mr. C. F. Jenkins
U.S. IFYGL Coordinator
Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

Official IFYGL Publications

IFYGL Bulletin Nos. 1-15 (January 1972 to June 1975)[1, 2]

IFYGL Technical Plan, Volumes 1-4 (series complete, 1971)[1]

IFYGL Canadian Projects, March 1972 (series complete, 1973)

Canadian Projects Supplement	No. 1 - July	1972
" " "	No. 2 - October	1972
" " "	No. 3 - February	1973
" " "	No. 4 - June	1973

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No. 2 "Radiation Measurement" by J. Ronald Latimer, 1972.
No. 3 "Measurement of Currents in the Great Lakes" by M. D. Palmer, 1973.
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[1] Available in the U.S. from the
U.S. IFYGL Project Office
Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

[2] Available in Canada from the
Canadian IFYGL Centre - ACHC
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario M3H 5T4

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CANADA

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CANADIAN PROJECT REPORTS

Notes: 1. Projects are numbered consecutively.

2. The letters following the number indicate which panel has prime responsibility for the project.

BC - Biology-Chemistry
BL - Boundary Layer
EB - Energy Budget
ME - Lake Meteorology and Evaporation
TW - Terrestrial Water Balance
WM - Water Movement
F - Feasibility

Project

1F: *Remote Sensing*

Principal Investigator: K.P.B. Thompson - CCIW

The project is complete. Three scientific papers have resulted from this project, and are listed in the IFYGL Bibliography. Two were authored by the Principal Investigator and a third is listed under R.P. Bukata.

3WM: *Statistical Predication of Lake Currents*

Principal Investigator: H.S. Weiler - CCIW

This project has been cancelled and there will be no material submitted to the IFYGL Data Bank.

4WM: Included in Project 45WM: *Lake Current Measurements*

5BL: *Direct Measurement of Energy Fluxes*

Principal Investigator: M. Donelan - CCIW

A number of papers have resulted from this project to date, and two have been published in the Proceedings of the 17th Conference on Great Lakes Research (IAGLR). They are entitled "Determination of the Aerodynamic Drag Coefficient from Wind Set-up" and "Generalized Profiles of Wind Speed, Temperature, and Humidity" and are listed in the Bibliography under the Principal Investigator. A further paper was presented at the 18th Conference

on Great Lakes Research (IAGLR) in May, entitled "The Influence of Wind Generated Waves on the Wind Profile" by M.A. Donelan. An internal report including all valid profile data from this project is now available from the Canadian IFYGL Data Bank.

8EB: *Shore Gauging Stations of Water Temperature*

Principal Investigator: D.G. Robertson - CCIW

A report on the results of the observations will be incorporated with the final report on Project 42EB by F.M. Boyce.

9EB: Included in Project 42EB.

11TW: *Monthly Water Balance of the Lake Ontario Basin*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

The calculations for this project are complete. A first draft of the Final Report to be included in the Terrestrial Water Balance Panel Report is in preparation. The following is a list of scientific papers that resulted from this IFYGL project:

Witherspoon, D.F. "A Hydrologic Model of the Local Lake Ontario Basin", Technical Bulletin No. 31. Inland Waters Branch, EM&R, Ottawa, Canada, 1970.

Witherspoon, D.F. "Storage in the Water Balance of the Lake Ontario Basin", Proceedings, World Water Balance Symposium, Reading, England, 1970.

Witherspoon, D.F. "Operational Uses of Regional Water Balance in the Lake Ontario Basin", presented at the Canadian Hydrology Symposium, Winnipeg, August, 1975.

12TW: *Monthly Water Balance of Lake Ontario*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

This project is essentially complete. A first draft of the Final Report to be included in the Terrestrial Water Balance Panel Report is in preparation. Final results await radar precipitation final values for the lake. The following papers have resulted from this project:

Witherspoon, D.F. "General Water Balance of Lake Ontario and Its Local Land Basin", International Geographical Congress, Montreal, August, 1972.

DeCooke, B.G. and D.F. Witherspoon. "Preliminary Lake Ontario Water Balance During IFYGL", Proceedings, 16th Conference, Great Lakes Research (IAGLR), Sawmill Creek, Ohio, April 1973.

DeCooke, B.G. and D.F. Witherspoon. "An Estimate of the Water Balance of Lake Ontario During IFYGL", Proceedings, IFYGL Symposium, 55th Annual Meeting, American Geophysical Union, April 8-12, 1974.

13TW: *Groundwater Flow into Lake Ontario*

Principal Investigator: D.H. Lennox - IWD

This project is complete. Two publications have resulted under the authorship of C.J. Haefeli and are listed in the IFYGL Bibliography.

14TW: *Hydrology of Lake Ontario*

Principal Investigator: E.A. MacDonald - IWD

The data have been submitted to the IFYGL Data Bank and the project is now complete.

15BL: *Space Spectra in the Free Atmosphere*

Principal Investigators: G.A. McBean and E.G. Morrissey - AES

Two papers have resulted from this project to date: "On the Spectral Structure of Turbulence in the Atmospheric Ekman Layer" by B.R. Kerman and "Reduction and Preliminary Analysis of Mesoscale Meteorological Data provided by NAE Low Level Research Flights in Connection with the IFYGL Program Technical Report", by D.W.B. Prentice.

16ME: *Airborne Radiation Thermometer Survey*

Principal Investigator: J.G. Irbe - AES

This project is complete. The final report on this project is being prepared.

18ME: *Climatological Network*

Principal Investigator: J.A.W. McCulloch - AES

This project is complete.

19ME: Included in Project 66ME.

20ME: *Bedford Tower Program*

Principal Investigator: J.A.W. McCulloch and D.W. Phillips - AES

Programs to convert from sensor output to scientific units and to apply calibration corrections have been written. Production runs are to commence in January 1976 and it is anticipated that the recoverable date will be submitted to the Data Bank by late February or early March 1976.

21ME: *Canadian Shoreline Network*

Principal Investigator: J.A.W. McCulloch - AES

Four tapes comprising 98% of the recoverable data were submitted to the Data Bank in November. Fully revised tapes with all usable data should be in the Data Bank by March 1976.

22ME: *Synoptic Studies*

Principal Investigators: M.E. Lalande and D.W. Phillips - AES

Four meteorological situations have been selected for detailed synoptic analysis. All available wind, temperature, humidity, and pressure data, are being gathered. One important objective will be to test a synoptician's analysis of the meteorological event using only standard network observations and then supplemented with IFYGL data.

23ME: *Radar Precipitation*

Principal Investigator: D.M. Pollock - AES

Digitization of the 5000 foot CAPPI radar photographs continued through the summer. The processing of 1972 data were virtually complete before an equipment malfunction forced a temporary halt. Rainfall rates calculated from the digitized radar information were combined with gauge data from several

selected precipitation events using an objective analysis technique. These results were encouraging but it is felt that further refinements to the technique are necessary. The test cases did emphasize the necessity to identify and eliminate ground clutter from the radar data during anomalous propagation conditions. A paper entitled "Precipitation Estimates by Radar During IFYGL", by W.D. Hogg and D.M. Pollock was presented at the Canadian Hydrology Symposium held in Winnipeg, August 11-14, 1975.

24ME: *Climatological Studies*

Principal Investigator: D.W. Phillips - AES

A hydrometeorological analysis of Hurricane Agnes, "Storm Agnes in the Lake Ontario Basin June 20-25, 1972", was published by the Atmospheric Environment Service as CLI-2-75. Copies may be obtained from the IFYGL Data Bank or writing to the Atmospheric Environment Service.

25ME: *Lake Ontario Evaporation by Mass Transfer*

Principal Investigator: J.G. Irbe - AES

Monthly and daily evaporation estimates have been prepared by the mass transfer method, and have been submitted to the Evaporation Synthesis Group.

26ME: *Over-Water Climatological Ratios*

Principal Investigator: D.W. Phillips and M.E. Lalande - AES

Project 26ME, "Wind and Humidity Ratios", has been renamed Over-Water Climatological Ratios. With tower, ship and buoy data now available, techniques for deriving over-land/over-water climatological ratios for temperature, humidity, wind speed and direction, pressure and precipitation have been developed. Sorting simultaneous data by stability, fetch and other criteria will be attempted to derive average ratios and measures of their variability.

27ME: *Island Precipitation Network*

Principal Investigator: J.A.W. McCulloch - AES

The data have been published in Supplementary Precipitation, Vol. 4, No's. 2 and 3.

28BL: *Momentum, Heat, and Moisture Transfer*

Principal Investigators: G.A. McBean, H.C. Martin, R.J. Polavarapu - AES

Data analysis is complete and a comprehensive data report has been submitted to the IFYGL Data Bank. The Data Report was presented in Bulletin No. 13. A recent paper on this subject was published in "Atmosphere", Vol. 13, Number 2, 1975, entitled "Turbulent Fluxes Over Lake Ontario During a Cold Frontal Passage" by G.A. McBean.

29BL: *Space and Time Spectra*

Principal Investigators: F.B. Muller and C.D. Holtz - AES

Data for the synoptic network have been provided to the IFYGL Data Bank. Additional data from the meso-scale network are held by the Principal Investigators.

30F: *CCGS Porte Dauphine - IFYGL Operations*

Principal Investigator: G.K. Rodgers - CCIW

Completed.

32EB: *Thermal Bar Study*

Principal Investigator: G.K. Rodgers - CCIW

Further progress is not likely until the results of the study regarding the heat content change of Lake Ontario are made available.

34WM: *Circulation Near Toronto*

Principal Investigator: G.K. Rodgers - CCIW

The final report is in preparation.

36EB: *Electronic Bathythermograph*

Principal Investigator: G.K. Rodgers - CCIW

This project is complete.

38TW: *Groundwater*

Principal Investigator: R.C. Ostry - OME

Several papers resulting from this project are listed in the IFYGL Bibliography under the Principal Investigator and S.N. Singer.

40WM: *Coastal Chain Study*

Principal Investigator: G.T. Csanady - University of Waterloo

Completed.

42EB: *Heat Storage of Lake Ontario*

Principal Investigator: F.M. Boyce - CCIW

The final report on this project is in preparation.

43EB: *Internal Wave Measurements*

Principal Investigator: F.M. Boyce - CCIW

The final data report is being compiled by C.H. Mortimer of the University of Wisconsin using input from F.M. Boyce.

44BL: *Analysis of Energy Fluxes*

Principal Investigator: F.C. Elder - CCIW

This project is essentially complete. Preliminary estimates of the energy fluxes have been computed on a weekly basis and entered into the data archives. A paper prepared in cooperation with J.A. Davies and F.M. Boyce was published in Part II of the Proceedings of the 17th Conference on Great Lakes Research. The The paper is entitled "Preliminary Energy Budget of Lake Ontario for the Period May Through November, 1972."

45WM: *Lake Current Measurements*

Principal Investigator: E.B. Bennett - CCIW

There is no further progress to report beyond that outlined in the paper "IFYGL Water Movement Program" co-authored by E.B. Bennett and J.H. Saylor. This paper was published in

Proceedings, IFYGL Symposium, 55th Annual Meeting of the American Geophysical Union, Washington, D.C., April, 1974.

46TW: *St. Lawrence-Niagara River Measuring Program*

Principal Investigator: M.H. Quast - IWD

This project is complete. The data report has been submitted.

47TW: *Computer Modelling*

Principal Investigator: L.E. Jones - University of Toronto

No report available.

49TW: *Snow Stratigraphy and Distribution*

Principal Investigator: W.P. Adams - Trent University

The paper, "Areal Differentiation of Snowcover in East Central Ontario" by W.P. Adams has resulted from this project. The abstract is as follows: Patterns of variation of snow depth, density, and water equivalent are identified using snow course, snow grid and random sample measurements. The limitations of generalizations about snowcover types in areas where mid-winter melt is a feature of snowcover evolution are discussed.

54BC: *Groundwater Supply Near Kingston*

Principal Investigator: W.A. Gorman - Queen's University

One paper has resulted from this project which is now complete. The paper entitled "Geochemistry of Deadman Bay Near Kingston, Ont." was prepared by L.M. Johnston as a M.Sc. Thesis.

55EB: Included in 32EB.

62ME: *Evaporation Synthesis*

Principal Investigator: H.L. Ferguson - AES

Little progress is expected in the activities of the Evaporation Synthesis Group until final reports from some of the evaporation studies have been received. A meeting of the Group is planned for the first quarter of 1976.

63EB: *Airborne Water Balance Study*

Principal Investigator: T.B. Kilpatrick - AES

This project is complete. A detailed report of the project's activities was included in Bulletin No. 9.

64ME: *Atmospheric Water Balance Study*

Principal Investigator: H.L. Ferguson - AES

A comprehensive report on this project was included in Bulletin No. 12. Three papers resulting from this project are listed in Bulletin No. 16. Continuing work on this project includes an analysis of the water vapour storage and flux divergence based on surface and tower data compared to estimates based on the rawinsonde network.

65ME: *Special Shoreline Evaporation Pan Network*

Principal Investigator: D.W. Phillips - AES

All data abstraction difficulties have been cleared up. It is expected that with a minimal amount of clerical assistance, estimates of pan evaporation will be placed in the Data Bank archive early in 1976.

66ME: *Basin Evapotranspiration*

Principal Investigator: H.L. Ferguson - AES

This project is now complete. A status report was presented in Bulletin No. 12, the abstract of a paper "Monthly Evapotranspiration Estimates for the Canadian Land Portion of the Lake Ontario Basin During IFYGL" by H.L. Ferguson and W.D. Hogg. This paper has been published in the Proceedings, 17th Conference for Great Lakes Research.

67ME: *Surface Water Temperature Distribution*

Principal Investigator: M.S. Webb - AES

The report on this project was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR) and was entitled, "Mean Monthly Temperatures of Lake Ontario During the IFYGL" by M.S. Webb.

68F: *CCIW Supporting Resources*

Principal Investigator: P.G. Sly - CCIW

Continues.

69TW: *Pleistocene Mapping*

Principal Investigator: E.P. Henderson - GSC

No report available.

70WM: *Ground Truth for Remote Sensing*

Principal Investigator: A. Falconer - Univ. of Guelph

A recent paper in unpublished manuscript form, has resulted from this project entitled, "Photo-Optical Contrast Stretching of Landset Data for Multidisciplinary Analysis of the Lake Ontario Basin" by A. Falconer, M. Deutsch, L.C. Myers and R. Anderson.

71EB: *Canadian Radiation Network*

Principal Investigator: J.A.W. McCulloch - AES

See project 80EB.

72EB: *Floating Ice Research*

Principal Investigator: R.O. Ramseier - DOE, Ice

Two papers have resulted from this project; "Studies on the Extension of Winter Navigation on the St. Lawrence River" by R.O. Ramseier and D. Dickins, and "Navigation Season Extension Studies, Gulf of St. Lawrence to Great Lakes, Winter 1972-73", by D. Dickins.

73EB: *Terrestrial Heat Flow*

Principal Investigator: A. Judge - EM&R

Last reported in Bulletin No. 10.

74TW: *Water Level Network*

Principal Investigator: G.C. Dohler

This project has been terminated. A paper resulting from this project, "Helmholtz Resonance in Harbours of the Great Lakes" by N.G. Freeman, P.F. Hamblin and T.S. Murty was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR), August, 1974.

75BL: *Wind and Temperature Fluctuations*

Principal Investigators: S.D. Smith and E.C. Banks - Bedford Institute

This project was completed with the publication of: "Eddy Flux Measurements Over Lake Ontario" by S.D. Smith, Boundary Layer Meteorology, Vol. 6, pp. 235-255. Some additional comparison work may be undertaken when Niagara Bar data from Donelan (CCIW) and McBean (AES) are available.

76WM: *Surface Wave Studies*

Principal Investigator: G.L. Holland - MSD

This project is complete with all data archived at the Canadian IFYGL Data Bank.

78TW: *Basin Water Balance*

Principal Investigator: M. Sanderson - University of Windsor

This project has been cancelled.

79F: *Bathymetric Surveys of Lake Ontario*

Principal Investigator: T.D.W. McCulloch - CCIW

This project is complete.

80EB: *IFYGL Radiation Balance Program*

Principal Investigator: J.A. Davies - McMaster University

This project was completed with the publication of "Canadian Radiation Measurements and Surface Radiation Balance Estimates for Lake Ontario During IFYGL" by J.A. Davies and

W.M. Schertzer. All data measurements have been submitted to the Data Bank.

81BC: *Materials Balance - Lake Ontario*

Principal Investigator: S. Salbach - OME

A comprehensive report was included in Bulletin No. 12.

82BC: *Lake Ontario Zooplankton Migration*

Principal Investigator: J.C. Roff - University of Guelph

Last reported in Bulletin No. 9. One paper, "Energetics of Vertical Migration in Mysis Loven 1862" by J.B. Foulds, has resulted from this project.

83BC: *Cooperative Studies of Fish Stocks*

Principal Investigator: W.J. Christie - OMNR

Work is progressing on this project. A final report on the fish species of Lake Ontario by Crossman and Van Meter is in manuscript form. All Three-Spine-Stickleback species were forwarded to Dalhousie University for further studies. Data resulting from the analysis of fish stomachs have been placed on magnetic tape and analysis of the data has begun. The inability to sample the small bottom living species along the rocky slopes has left a hole in the data. Subsequently a new style baited trap was developed and some success was reported. However, it is unlikely that data resulting from the baited trap will appear in the Final IFYGL Report. Material for the Final Report will be prepared under two categories: "Nearshore", coordinated by W.T. Hartman (U.S. Bur. Sport Fisheries and Wildlife) and G. LaTendre (N.Y. Energy Comm.) along with D.A. Hurley (OMNR) and S.J. Nepszy (OMNR); and "Offshore", coordinated by J.A. Kutkula (OMNR) and W.J. Christie (OMNR).

84BC: *Cladophora Growth*

Principal Investigator: G.E. Owen - OME

Results of Biomass Study and Ground Truth information will be presented in the final report on this project to be completed by early 1976.

85BC: *Nutrient Cycles - Lake Ontario*

Principal Investigator: A.S. Fraser - CCIW

A paper dealing with this project is in the final phase of preparation. An earlier paper has been published in the Proceedings, 17th Conference on Great Lakes Research" by P. Stadelmann and A.S. Fraser. The abstract follows, "Canadian Project Reports", of IFYGL Bulletin No. 16.

87EB: Included in Project 42EB.

89WM: *Turbulent Diffusion Studies*

Principal Investigator: C.R. Murthy - CCIW

In addition to papers listed in previous Bulletins and the IFYGL Bibliography the following scientific papers have resulted from this project:

C.R. Murthy. Horizontal diffusion characteristics in Lake Ontario. Vol. Journal of Physical Oceanography.

C.R. Murthy and J.O. Blanton. Coastal zone climatological studies of the Laurentian Great Lakes. Proc. Second World Congress on Water Resources.

C.R. Murthy and A. Okubo. Interpretation of diffusion characteristics of oceans and lakes appropriate for numerical modeling. Proc. Symposium on Modeling of Transport Mechanisms in Oceans and Lakes, CCIW, Burlington, Ontario.

90WM: Included in Project 89WM.

94: *Data Retransmission by Satellite*

Principal Investigator: H. MacPhail - CCIW

The final report on this project is completed, and is entitled, "Data Retransmission via satellite, Field Year 1972" authored by the Principal Investigator.

95WM: *Hydrodynamic Modelling*

Principal Investigator: T.J. Simons - CCIW

For a complete report see Bulletin No. 12. There were five scientific papers published from this project and they are listed in the Bibliography under the name of the Principal Investigator. This project is now complete.

96WM: Included in Project 45WM.

97BL: *Meteorological Buoy Measurements*

Principal Investigator: F.C. Elder - CCIW

This project is complete and all data have been submitted to the Data Bank. One paper entitled, "The Evaluation of the Measurement Accuracy of the CCIW IFYGL Meteorological Buoy" authored by M.A. Donelan and F.C. Elder was presented at the 18th Conference on the Great Lakes.

98BC: *Lake Ontario Cross Section Study*

Principal Investigator: M. Munawar - CCIW

A paper resulting from this project was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR) 1974, entitled, "The Abundance of Diatoms in the Southwest Nearshore Region of Lake Ontario During the Thermal Bar Period" by G.J. Lorefice and M. Munawar.

101BC: *Lake Ontario Primary Production Study*

Principal Investigators: M. Munawar and J.E. Moore

The project has been completed. The following papers have resulted from this project: "Biomass Parameters and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL" by P. Stadelman and M. Munawar; "Phytoplankton Biomass, Its Species Composition and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL" by M. Munawar, P. Stadelman and I.F. Munawar.

102BC: *Lake Ontario Diel Pigment Variation*

Principal Investigators: W. Glooschenko and M. Munawar - CCIW

This project is complete. The abstract of the final paper was included in Bulletin No. 12.

103BC: *Pesticide Concentration in Bird's Eggs*

Principal Investigator: M. Gilbertson - CWS

This project is essentially complete. Several papers have resulted to date and are listed in the IFYGL Bibliography under the Principal Investigator.

104BC: *Rain Quality Monitoring*

Principal Investigator: M. Shiomi - CCIW

No report available. See Bulletin No. 9 for last complete report.

107BL: *Air Pollution Sinks*

Principal Investigator: D.M. Whelpdale - AES

This project is complete. Two publications have resulted: "Sulphur Dioxide Removal by Turbulent Transfer Over Grass, Snow and Water Surfaces" by D.M. Whelpdale and R.W. Shaw; and "Sulphate Deposition by Precipitation into Lake Ontario" by R.W. Shaw and D.M. Whelpdale. Both are listed in the IFYGL Bibliography.

108BL: *Lake Level Transfer*

Principal Investigator: G.C. Dohler - MSD

This project has been terminated with several papers to be published.

109WM: *Upwelling Study*

Principal Investigator: G.K. Rodgers - CCIW

The Final Report is in preparation.

110WM: *Hydro Intake Study*

Principal Investigator: A. Arajs - OH

This project was completed with the paper "Nearshore Currents and Water Temperatures Along the North Shore of Lake Ontario Between Pickering and Cobourg" by A.A. Arajs and R. Faroqui. The Abstract is presented following the portion, "Canadian Project Reports", of IFYGL Bulletin No. 16.

111WM: *Lakeview Dispersion Study*

Principal Investigator: M.D. Palmer - OME

This project is complete, and all the data have been submitted to the IFYGL Data Bank.

112BC: *Threespine Stickleback*

Principal Investigator: E.T. Garside - Dalhousie University

No report available. Last reported in Bulletin No. 9.

114WM: Included in Project 89WM.

115WM: *Wave Climatology*

Principal Investigator: H.K. Cho - CCIW

The data have been submitted to the Data Bank.

116TW: *Airborne Gamma Ray Snow Survey*

Principal Investigator: H.S. Loijens - IWD, Glaciology

The project was last reported in Bulletin No. 9. The project has been terminated; however, research in the use of natural gamma radiation for snow-water equivalent and soil moisture determination is continuing.

117ME: *APT Photographs*

Principal Investigator: J.A.W. McCulloch - AES

This project is now completed. The microfilm is on file at the IFYGL Data Bank.

118: *Canadian IFYGL Data Bank*

Principal Investigator: J. Byron - CCIW

Cat. No. 3-118-043 "Helmholtz Ressonance in Harbours of the Great Lakes", by N.G. Freeman, P.F. Hamblin and T.S. Murty.

Cat. No. 3-118-044 "On Vertical Transfer of Momentum in a Lake", by P.F. Hamblin and J.R. Salmon.

IFYGL ABSTRACTS

Nine IFYGL papers, with Canadian participation, were published in the second volume of the Proceedings, 17th Conference on Great Lakes Research (IAGLR), August 1974. Abstracts of these papers are presented here:

THE ABUNDANCE OF DIATOMS IN THE SOUTHWESTERN NEARSHORE REGION OF LAKE ONTARIO DURING THE SPRING THERMAL BAR PERIOD

George J. Lorefice and Hohiuddin Munawar

(IFYGL Project 98BC)

As a part of the IFYGL program an intensive study was carred out during April and May 1972 in the nearshore region of Lake Ontario. Water samples were collected from 45 stations on the southwestern nearshore area of Lake Ontario at ½, 4 and 8 kms. Using the Utermohl technique, phytoplankton was analyzed qualitatively and quantitatively. During the investigation period the thermal bar remained within the study area. In April it stayed shoreward of the 4 kms stations dipping into and out of the shore. By May it had advanced farther out but in most cases to less than 8 kms.

Total phytoplankton biomass along with diatoms, particularly Melosira binderana Kutz., showed high concentrations on the nearshore side of the thermal bar. This observation may be related to temperature and the concentration of nutrients in the nearshore region. Diatoms accounted for 58% of the biomass in April and 48% in May. During April Surirella angustata Kutz., Phodomonas minuta Skuja and Peridinium aciculiferum (Lemm.) Lemm. were the most common species while M. binderana Kutz., P. aciculiferum and Melosira islandica ssp. helvetica O. Muller were common in May.

PHYTOPLANKTON BIOMASS, SPECIES COMPOSITION AND PRIMARY PRODUCTION AT A NEARSHORE AND A MIDLAKE STATION OF LAKE ONTARIO DURING IFYGL (IFYGL)

M. Munawar, P. Stadelmann and I.F. Munawar

(IFYGL Project 101BC)

As a part of the Canadian contribution to the International Field Year for the Great Lakes (IFYGL), qualitative and quantitative analyses of phytoplankton were carried out at a nearshore and a mid-lake station. Samples were collected on two consecutive days by an integrating sampler (0-10 m) during nine cruises extending from April 1972 to March 1973. Simultaneously, chlorophyll a samples were taken, and carbon-14 uptake was measured in an incubator. About one hundred taxa were identified in

samples from each station and contained several phytoflagellates and 'less common' species neglected in other IFYGL investigations. On a biomass basis the 'less common' species contributed significantly to the total phytoplankton biomass. The dominance of phytoflagellates for most of the year at both stations was striking. Similarly, nannoplankton ($\lesssim 64\mu$) dominated the phytoplankton at both stations throughout the study period. At times more than 85% of the total photosynthesis was due to the nannoplankton fraction.

IFYGL STREAM MATERIALS BALANCE STUDY (IFYGL)

D.J. Casey and S.E. Salbach

(IFYGL Project 81BC)

The object of this paper is to report on the results of studies conducted as part of the International Field Year for the Great Lakes by the U.S. Environmental Protection Agency and the Ontario Ministry for the Environment to determine the amount of materials entering and leaving Lake Ontario. Owing to budget considerations and hydrologic differences, the Canadian and U.S. programs differed in regard to the frequency of stream sampling and to some extent, in regard to parameters measured.

The paper addresses mean annual loadings to Lake Ontario for total phosphorus, soluble phosphorus, ammonia, total nitrogen, nitrate, sulfate and various metals. A materials balance budget for total phosphorus, total nitrogen, and chloride for Lake Ontario has been calculated and is referred to. The problem of determining what frequency of stream sampling would produce the best results is also referred to.

IFYGL CHEMICAL INTERCOMPARISONS (IFYGL)

Andrew Robertson, Floyd C. Elder and Tudor T. Davies

During the IFYGL program three separate intercomparisons of chemical determinations were conducted. In the first study, samples of known concentration for a number of properties were sent for analysis to several laboratories. Statistical evaluation of the results from these determinations showed that, except for sodium, there was little evidence that the means for the laboratory determinations differed from the comparable known concentrations. However, the results of this study did indicate that, for most of the properties, there were systematic differences among the results from the participants. This work also indicated that the random error component of the variance increased when the analyses were carried out at different times or, in other words, that the systematic errors in the various laboratories were not constant with time.

In the second study, samples were obtained at four depths at each of two stations and each sample was spilt into four parts. For one of these a number of determinations were conducted immediately on the vessel. The

other three subsamples were frozen and sent to three of the major IFYGL laboratories, and the same analyses were conducted as aboard the ship. This procedure was carried out five different times. Analysis of the results showed statistically significant differences among the results from the three laboratories for many of the parameters. Analyses carried out by the same agency on the frozen and unfrozen subsamples showed freezing also significantly affected many of the results.

In the third study, several of the vessels involved in IFYGL were brought together and similar sampling programs were carried out on each. Series of replicate samples were obtained by each vessel and one of the replicates was analyzed by each of the three participating laboratories. The data for this work indicate that differences in sampling methods among the vessels probably have a relatively minor effect on the results obtained. However, substantial differences in the results from the different laboratories for a number of parameters were again found.

PRELIMINARY ENERGY BUDGET OF LAKE ONTARIO FOR THE PERIOD MAY THROUGH NOVEMBER, 1972 (IFYGL)

F.C. Elder, F.M. Boyce and J.A. Davies

(IFYGL Project 44BL)

Measurements were made during the International Field Year for the Great Lakes which permit calculation of the thermal energy budget for Lake Ontario for the April to December period. A network of meteorological measurement stations provided data from which latent and sensible heat flux were calculated. Global solar and long-wave radiation measurements allowed assessment of the net radiation balance. Approximate bi-weekly intensive temperature surveys provided for independent computation of the lake heat storage.

Over the period for which measurements were available, the measured heat storage exceeded the value calculated from the energy budget by over 8000 cal cm^{-2}. This amounts to difference of 33 cal cm^{-2} day^{-1} or approximately 5% of the maximum daily flux.

Analysis of the possible error in each of the budget terms indicates that the net radiation calculations are most likely the largest contributor. The incoming long-wave radiation estimates are least subject to verification and are believed to contain the greatest degree of uncertainty.

THE ATMOSPHERIC BUDGETS PROGRAM OF IFYGL (IFYGL)

E.M. Rasmusson, H.L. Ferguson, J. Sullivan, and J. den Hartog

(IFYGL Project 64ME)

The water vapor and heat budgets of the atmosphere over Lake Ontario will be evaluated to obtain estimates of average lake evaporation for periods on the order of a week. Data for this project were obtained during September-December 1972 from a six-station network of LORAN-C rawinsonde stations located along the perimeter of the lake.

The design of the experiment and results of the field program are reviewed. Unexpected errors in the LORAN-C time delay data required a significant sacrifice of vertical resolution in the processed wind data. However the relatively high time and vertical resolution of the temperature and humidity data reveal the detailed structure of these fields to a degree not attainable with routine operational data.

A set of conservation equations, suitable for budget analyses over Lake Ontario, is derived. Special attention is given to the possibility of phase changes between liquid, solid, and vapor states, and problems arising when the flux of condensed moisture across the shoreline is significant.

A budget analysis scheme is discussed in which the meteorological fields are represented in terms of a set of orthogonal functions in time and space. Examples of fitted wind and humidity fields are presented.

DETERMINATION OF THE AERODYNAMIC DRAG COEFFICIENT FROM WIND SET-UP (IFYGL)

M.A. Donelan, F.C. Elder and P.F. Hamblin

(IFYGL Project 5BL)

The estimation of wind stress from the steady state water set-up of an enclosed water body is fraught with uncertainties arising primarily from measurement errors of the overall wind field and the water level in the presence of shoaling waves. During the IFYGL there were several accurate water level recording gauges installed around Lake Ontario, and the wind field was monitored continuously at a score of stations across the Lake. In addition, a "deep-water" gauge was installed off Niagara-on-the-Lake. This gauge is compared with nearby gauges in shallower water to assess the effect of wave set-up on the water level measurements in shallower water. From this it is concluded that the difference in water level between Burlington and Oswego is probably accurate for eastward surface stress. The effects of atmospheric pressure, tides and seiches are removed and the

error due to bottom stress is shown to be small. Finally the corrected and filtered water levels are correlated with the lake-wide average stress and drag coefficients deduced for unstable and neutral atmospheric boundary layers. The drag coefficient obtained from the data points without regard to stability is 1.35×10^{-3}; that for neutral conditions is smaller, and unstable conditions larger.

SHORT PERIOD TIDES IN LAKE ONTARIO (IFYGL)

Paul F. Hamblin

(IFYGL Project 14TW)

The diurnal and semidiurnal tides of Lake Ontario are simulated numerically by means of a numerical hydrodynamical model in which only the spacial derivatives are discretized. The semianalytical model predicts a direct response for both tidal constituents, that is, in the direction of rotation of the tidal generating force. The sense of rotation is cum sole for the semidiurnal oscillation and in the opposite sense for the diurnal tide. Maximum predicted amplitudes of 12.1 mm occur at the western extremity of the lake for the semidiurnal tide and 5.2 mm at the same location for the diurnal tide.

The main feature of the predicted response, that the semidiurnal tide rotates in a clockwise direction is corroborated by the observations at 16 tidal gauges around the lake. An amphidromic point in both the model and prototype is located at a mid-lake position to the north of Rochester. The tidal solutions are relatively insensitive to bottom friction which does not reasonably account for the fact that the observed amplitudes are 70% of the theoretical amplitudes. This discrepancy is well explained by the effect of the earth tide and is in close agreement with measurements of the earth tide found in the literature.

OPTICAL PROPERTIES OF THE GREAT LAKES (IFYGL)

K.P.B. Thomson, J. Jerome and W.R. McNeil

(IFYGL Project 1F)

During the International Field Year on the Great Lakes a series of in situ optical measurements were carried out as part of the Lake Ontario Organic Particle Study.

The principal optical measurement made during each cruise, was the downwelling inrradiance of sunlight from 400-700 nm, as a function of depth.

These data were used to investigate the optical characteristics of Lake Ontario in terms of the spectral transmittance of the downwelling irradiance. In addition, similar measurements from Lake Erie and Lake Superior have been analyzed and compared with the Lake Ontario data.

The analysis and intercomparison of the data for the three Great Lakes is based on Vollenweider's statistical model of the extinction coefficient. On the basis of this model significant deviations from Vollenweider's standard distribution can be identified as differences in the optical characteristics of a lake resulting from the limnological properties of the particular water body. Comparison of the extinction and the linear regression coefficients, obtained from the Great Lakes, to the standard distribution shows significant deviations in the blue (430 nm) and red (630 nm) regions of the spectrum. These differences are interpreted to mean that the Laurentian Great Lakes contain appreciable amounts of humic substances, this is substantiated by laboratory absorption measurements on filtered samples.

The data also show that the seasonal variations of the mean vertical extinction coefficient "MVEC" delineate clearly the physical and biological changes in the lakes. The mean vertical extinction coefficient can be used as a gross indicator of the general optical state of the lake.

UNITED STATES

Editors — Fred Jenkins and May Laughrun

Typing — Judith L. Schaffer

COMMENTS BY THE U.S. DIRECTOR

This issue covers progress from July 1 through September 30, 1975 (fig. 1).

Tudor Davies has been replaced on the Joint Management Team and the Joint Steering Committee by Nelson A. Thomas of the EPA Grosse Ile Laboratory. Tudor has moved to the EPA Gulf Breeze Laboratory in Florida. All of us who have worked with him have gained by the association and he has contributed greatly to the success of the IFYGL program, particularly to the work of the Biology and Chemistry Panel.

Scientists conducting studies based on IFYGL data are asked to provide summary reports of their work to the IFYGL Project Office (see the address of the U.S. IFYGL Coordinator in the front section of this issue). These reports will be published in future issues of the Bulletin to keep all IFYGL participants aware of research results. Scientists are also asked to notify the IFYGL Coordinators (United States or Canadian) of any IFYGL publications not listed in the Bibliography section of this issue.

Finally, it is requested that all United States task scientists inform W. T. Hodge, the United States Data Manager, of any errors in the Archive listings contained in the last section of this Bulletin and that they update their estimates of delivery of data to the IFYGL Archive when necessary.

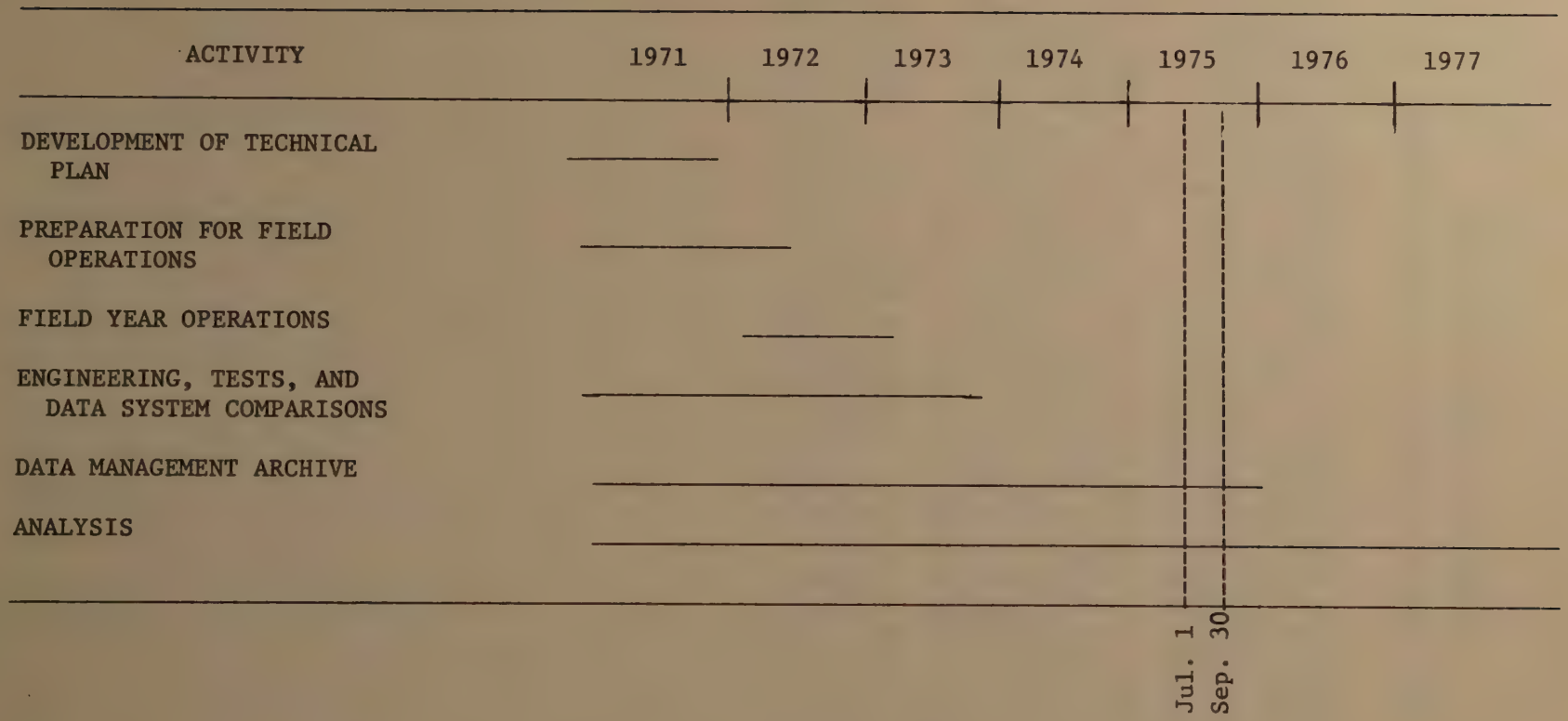

Figure 1.--U.S. IFYGL schedule.

LAKE ONTARIO MEAN SURFACE TEMPERATURE

R. L. Pickett and B. J. Eadie
Great Lakes Environmental Research Laboratory
Ann Arbor, Michigan

Temperature climatologies can be used as a first guess in predicting lake temperatures and temperature changes, as well as in determining if particular years are cooler or warmer than usual. Also, they are useful for calibrating physical or ecological models for mean and range conditions.

With these applications in mind, a climatology of Lake Ontario's mean surface temperature was prepared. The data were drawn from the years 1935 to 1946 (Millar, 1952), 1959 to 1961 (Rogers and Anderson, 1973) and 1972 (IFYGL). A polynomial was then fitted to these mean surface temperature data, and temperatures for selected dates were extracted (table 1).

The table shows that early in the year the lake surface is still cooling. By the middle of February the minimum is reached, and for a month the mean surface temperature remains nearly constant at 1°C. Next, the temperature climbs steadily until August when a 20°C maximum is reached. Again the lake surface temperature is constant for a month until the middle of September. Cooling then sets in, and temperatures drop more rapidly since convection aids the cooling process.

Table 1.--Lake-averaged surface temperature for Lake Ontario

Date	Temperature (°C)	Date	Temperature (°C)
Jan. 1	2	July 1	16
Jan. 16	2	July 15	18
Feb. 1	2	Aug. 1	20
Feb. 14	1	Aug. 15	20
Mar. 1	1	Sept. 1	20
Mar. 15	1	Sept. 15	18
Apr. 1	2	Oct. 1	16
Apr. 15	3	Oct. 15	13
May 1	6	Nov. 1	9
May 15	8	Nov. 15	6
June 1	11	Dec. 1	4
June 15	14	Dec. 15	3

References

Millar, F. G., "Surface Temperatures of the Great Lakes," Journal of the Fisheries Research Board of Canada, Vol. 9, 1952, pp. 329-376.

Rodgers, G. K., and D. V. Anderson, "The Thermal Structure of Lake Ontario," Proceedings of the Sixth Conference on Great Lakes Research, University of Michigan, Great Lakes Research Division, Pub. No. 10, 1973, pp. 59-69.

U.S. SCIENTIFIC PROGRAM

Based upon reports requested by the U.S. IFYGL Project Office, the progress from July 1 through September 30, 1975, is presented for each of the U.S. IFYGL tasks. Some reports cover work done in October and November. Results of task work can be found by referring to the bibliography in the front of this issue and in the Data Management section under the Principal Investigators' names and the task numbers.

Tasks

1. *Phosphorus Release and Uptake by Lake Ontario Sediments*

   Principal Investigators: D. E. Armstrong and R. F. Harris - University of Wisconsin

   Task completed.

2. *Net Radiation*

   Principal Investigator: M. A. Atwater - CEM

   Task completed.

3. *RFF/DC-6 Boundary Layer Fluxes*

   Principal Investigator: B. R. Bean - ERL/NOAA

   Task completed.

4. *Nitrogen Fixation*

   Principal Investigator: R. Burris - University of Wisconsin

   Task completed.

5. *Profile Mast and Tower Program*

   Principal Investigator: J. A. Businger - University of Washington

   No report.

6. *Status of Lake Ontario Fish Populations*

   Principal Investigator: J. H. Kutkuhn - Great Lakes Fisheries Laboratory

   The final report is still in preparation.

7. *Material Balance of Lake Ontario*

Principal Investigator: D. J. Casey - EPA

Preliminary individual reports on the Genesee, Oswego, and Black Rivers, as well as a combined report on the Niagara and St. Lawrence Rivers, have been prepared. One of eleven lake cruise reports is complete in draft form. Work on this task is expected to terminate as of December 31, 1975.

8. *Runoff*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Task completed.

9. *Evaporation (Lake-Land)*

Principal Investigator: L. T. Schutze - U. S. Army Corps of Engineers

No progress this quarter.

10. *Simulation Studies and Analyses Associated With the Terrestrial Water Balance*

Principal Investigator: B. G. DeCooke - U. S. Army Corps of Engineers

Activity has not begun.

11. *Land Precipitation Data Analysis*

Principal Investigators: J. R. Weiser[1] - U.S. Army Corps of Engineers

The data have been reduced and analyzed.

12. *Transport Processes Within the Rochester Embayment of Lake Ontario*

Principal Investigator: J. H. Thomas - University of Rochester

Task completed.

13. *Soil Moisture and Snow Hydrology*

Principal Investigator: W. N. Embree - U. S. Geological Survey

The final report is completed and in review within the USGS.

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[1]J. R. Weiser has been assigned as Principal Investigator on this task.

14. *Boundary Layer Structure and Mesoscale Circulation*

Principal Investigator: M. A. Estoque - University of Miami

See Task 15 below.

15. *Mesoscale Simulation Studies*

Principal Investigator: M. A. Estoque - University of Miami

The paper on "A Lake Breeze Over Southern Lake Ontario", has been completed and sent to the Monthly Weather Review for publication. The two other reports mentioned in the previous quarterly report are still being written. Little progress has been made in the three-dimensional modeling work.

16. *Water Transfer Across Large Lake*

Principal Investigator: H. W. Stoughton - State University of of New York at Alfred

A bibliography on the state-of-the-art on water-level transfer techniques is about 90 percent complete. Evaluation of United States and Canadian meteorological data related to the effects on water levels will begin in December.

17. *Nearshore Ice Formation, Growth, and Decay*

Principal Investigator: J. Dilley - General Electric Company

An improved eddy diffusivity model is being developed to account for wave and current mixing and thermal instabilities (convective mixing). The amount of mixing will be a function of wind speed and direction, onshore winds generating more wave action and more mixing than offshore winds. Convective mixing, a function of the vertical density gradient, is important when the wave action and currents are very small. Heat transfer due to precipitation can be shown to be small in comparison with the other heat-transfer modes. However, the insulating effect of a snow cover cannot be neglected and is being included in the model. The numerical scheme that computes the motion of the freezing and melting fronts has been improved and is being checked against a known one-dimensional solution.

Based on characteristic ice patterns, availability of data, and spatial resolution, four sites have been selected for discrete application of the model: Oswego and Olcott on the southern shore and Kingston and Cobourg on the northern shore. Meteorological data for the first three sites, as well as water temperature data for Cobourg, have been received from the National Climatic Center.

Once the model has been improved, simulations of the three ice periods observed east of Oswego at Nine Mile Point during the winter of 1972-73

will be run and compared with field data in order to evaluate the accuracy of the model. The last and most important phase of this task will be to apply the model also to the Olcott, Kingston, and Cobourg sites. The nearshore model will be complemented with an offshore ice model with the goal of estimating the contribution of ice formation, growth, and decay to the whole lake heat budget.

18. *Advection Term - Energy Balance*

Principal Investigator: J. Grumblatt - LSC/NOAA

Stream temperature and volume flow data were received for Lake Ontario shoreline areas.

19. *Occurrence and Transport of Nutrients and Hazardous Polluting Substances in the Genesee River Basin*

Principal Investigator: L. J. Hetling - New York State Department of Environmental Conservation

Task completed.

20. *Boundary Layer Flux Synthesis*

Principal Investigator: J. A. Almazan - CEDDA/NOAA

A study of the low-level averaged vorticity and divergence field over Lake Ontario during May through November 1972 has begun for the purpose of determining the feasibility of using the United States and Canadian buoy wind data to obtain estimates of the contribution of atmospheric forcing to the lake circulation. An example of preliminary results is shown in figure 2, based on hourly values of the vorticity and divergence estimates. The lake-land breeze cycle is shown by midday divergence and nighttime convergence.

The tower wind and temperature data from the southern shore and United States and Canadian buoy data are being used in an analysis of the effects of atmospheric stability and fetch on the wind speeds over the lake during IFYGL. As soon as the data from the north coastal chain become available, they will be incorporated in the anlaysis.

21. *Hazardous Material Flow*

Principal Investigator: G. F. Lee - University of Texas at Dallas

Final report in preparation.

22. *Remote Measurement of Chlorophyll With Lidar Fluorescent System*

Principal Investigator: H. H. Kim - NASA

Task completed.

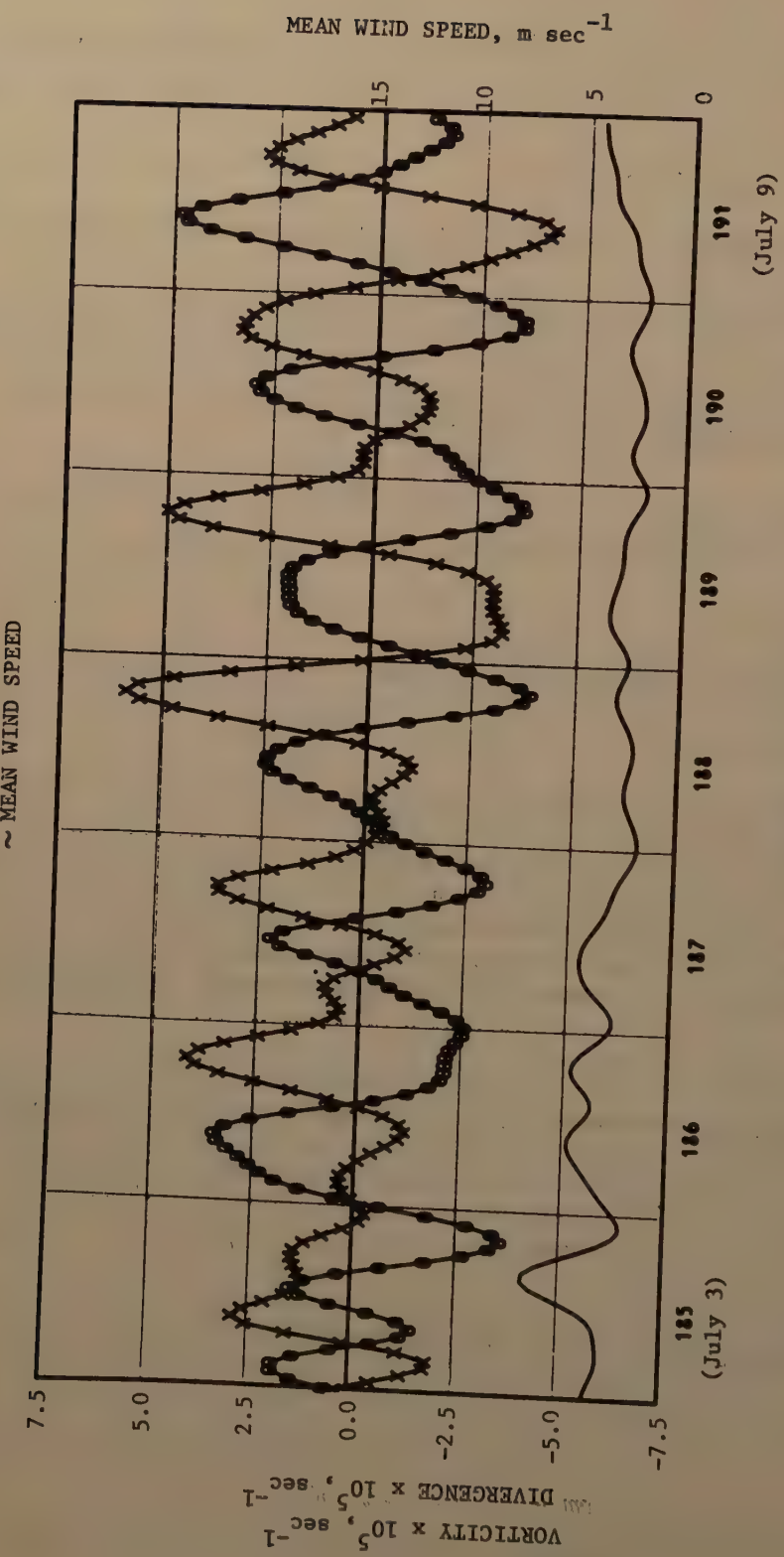

Figure 2.--Time series of vorticity and divergence over Lake Ontario. Data shown are taken from the period July 3-9, 1972.

23. *Inflow/Outflow Term - Terrestrial Water Budget*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

Task completed.

24. *Use of an Unsteady State Flow Model to Compute Continuous Flow*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

No progress this quarter.

25. *Radiant Power, Temperature, and Water Vapor Profiles Over Lake Ontario*

Principal Investigator: P. M. Kuhn - ERL/NOAA

Work completed.

26. *Algal Nutrient Availability and Limitation in Lake Ontario*

Principal Investigator: G. F. Lee - University of Texas at Dallas

The final report was submitted to the EPA Grosse Ile Laboratory in August.

27. *Wave Studies*

Principal Investigator: P. C. Liu - GLERL/NOAA

The 197-page data report on "Surface Wave Data Recorded in Lake Ontario During IFYGL" has been published as NOAA Technical Memorandum ERL GLERL-2. Copies are available from GLERL. The paper on "IFYGL Ship Wave Observations vs. Wave Measurements," presented at the 18th Conference on Great Lakes Research, has been accepted for publication in the Journal of Great Lakes Research.

28. *Cloud Climatology*

Principal Investigator: W. A. Lyons - University of Wisconsin, Milwaukee

No report.

29. *Zooplankton Production in Lake Ontario as Influenced by Environmental Perturbations*

Principal Investigator: D. C. McNaught - State University of New York at Albany

Task completed.

30. *Change in Lake Storage Term - Terrestrial Water Budget*

Principal Investigator: R. Wilshaw - U.S. Army Corps of Engineers

Errors in the data tabulation are being corrected.

31. *Soil Moisture*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Work not begun.

32. *Testing of COE (Corps of Engineers) Lake Levels Model*

Principal Investigator: E. Megerian - U.S. Army Corps of Engineers

This task has been canceled.

33. *Nearshore Study of Eastern Lake Ontario*

Principal Investigator: R. B. Moore - State University of New York at Oswego

Task completed.

34. *Internal Waves - Transects Program - Interpretation of Whole-Basin Oscillations*

Principal Investigator: C. H. Mortimer - University of Wisconsin, Milwaukee

A report on the transects program is nearing completion. No progress has been made in the internal-wave analysis.

35. Pontoporeia affinis *and Other Benthos in Lake Ontario*

Principal Investigator: S. C. Mosley - University of Michigan

No report.

36. *Pan Evaporation Project*

Principal Investigators: C. N. Hoffeditz - NWS/NOAA
J. A. W. McCulloch - AES, Canada

Dewpoint and radiation data for Lake Ontario peripheral stations have been received from NCC and are being prepared for processing.

37. *Simulation Studies and Other Analyses Associated With U.S. Water Movements Projects*

Principal Investigators: J. P. Pandolfo and C. A. Jacobs - CEM

Task completed.

38. *Structure of Turbulence*

Principal Investigator: H. A. Panofsky - Pennsylvania State University

Task completed.

39. *Airborne Snow Reconnaissance*

Principal Investigator: E. L. Peck - NWS/NOAA

Task completed.

40. *Optical Properties of Lake Ontario*

Principal Investigator: K. R. Piech - Calspan Corporation

No progress during this quarter.

41. *Storage Term - Energy Balance Program*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

This task effort continues to wait on availability of electronic bathythermograph data from the IFYGL ship cruises.

42. *Sensible and Latent Heat Flux*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Estimates of the Bowen ratio are being compared with actual measurements and with calculations of latent and sensible heat flux. Relatively few measurements have been found; if other investigators have knowledge of additional observations it would be desirable to obtain them. The feasibility of using representive stations for the entire lake is being examined.

43. *Thermal Characteristics of Lake Ontario and Advection Within the Lake*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

This task is a follow-up of Task 41 and is inactive pending availability of ship temperature data.

44. *Oswego Harbor Studies*

Principal Investigator: G. L. Bell - GLERL/NOAA

Data on magnetic tape were submitted to the IFYGL Archive at NCC in Asheville, N.C. The following documentation indicates the type of data archived and the format. Progress continues on the final report.

IFYGL Shipboard Station Data Tape (R/V Shenehon)

Tape Characteristics: 7-track, 800 BPI, 8,000-character record blocks (100 card image records per block)

File Format: 26 individual card image files, each separated by one blank 80-character record, as follows:

File	Content
1.	Latitude and longitude of observation
2.	Depth of observation
3.	Temperature (reversing thermometer)
4.	Sodium
5.	Sulfate
6.	Phosphate
7.	Calcium
8.	Magnesium
9.	Potassium
10.	Nitrate
11.	Silicon dioxide
12.	Chloride
13.	pH
14.	Oxidation reduction potential
15.	Phenolphthalein alkalinity (CACO3 equivalent)
16.	Total alkalinity (CACO3 equivalent)
17.	Specific conductance
18.	Dissolved oxygen
19.	Dissolved oxygen (percent saturation)
20.	pH (bottom sediment)
21.	Oxidation reduction potential (bottom sediment)
22.	Non-filtrable residue
23.	Bathythermograph
24.	Transparency
25.	Solids, volatiles, and oil
26.	Chemical oxygen demand (bottom sediment)

All files are tied together by cruise and station numbers, which are provided on every record of each file. File 1 gives the positional and time information for each cruise/station observation.

Files 2 through 21 are tied together by format. These formats are all identical. The data fields in files 3 through 19 relate to the depth information in the corresponding fields of file 2. In files 20 and 21 only the first data field is used for the bottom sediment data, which relate to the last filled data field of file 2 (bottom depth).

In files 22 through 26 depth information is included.

Record Formats

File 1 Position and Time

Col.	Mode	Description
1,2	NUM	Lake code (2 on this tape)
3,4	NUM	Last two digits of year
5,6	NUM	Cruise number
7		Blank
8-15	ALPH	Data identifier (LAT-LON on this file)
16-18	NUM	Station number
19-23		Blank
24,25	NUM	Month
26-28		Blank
29,30	NUM	Day
31,32		Blank
33-35	NUM	Hour and tenths
36-38		Blank
39,40	NUM	Latitude, degrees
41,42		Blank
43-45	NUM	Latitude .001 degrees
46-48		Blank
49,50	NUM	Longitude degrees
51,52		Blank
53-55	NUM	Longitude .001 degrees
54-58		Blank
59-60	NUM	Number of levels (depths) sampled

Files 2 through 19 Depth (2) and Varied Data (3-19)

Col.	Mode	Description
1-18		Same as file 1
19,20		Blank
21-80	NUM	Data points in 12 fields of 5

Files 20 and 21 are the same as files 2 through 19 except only the first data field (col's 21-25) is used.

File 22 Non-Filtrable Residue

Col.	Mode	Description	Units
1,2	ALPH	Location identifier (OS)	
3,4	NUM	Cruise number	
5-7	NUM	Station number	

Col.	Mode	Description	Units
8,9		Year	
10,11	NUM	Sample number	
12-15	NUM	Sample volume	ml
16-20	NUM	Weight of filter	g x 10^4
21-26	NUM	Weight of sediment and filter	g x 10^4
27-32	NUM	Weight of sediment	g x 10^4
33-77		Blank	
78-80	ALPH	Data identifier (NFR on this file)	

Files 23 and 24 Multiple Card Records

Bathythermograph (23) and Transparency (24)

First card of record:

Col.	Mode	Description	
1,2	ALPH	Location identifier (OS)	
3,4	NUM	Cruise number	
5-7	NUM	Station number	
8,9	NUM	Year	
10,11	NUM	Month	
12,13	NUM	Day	
14,17	NUM	Water depth (sonic)	
18		Blank	
19	ALPH	Temperature correction sign	Blank on file 24
20-22	NUM	Temperature correction	
23-25		Blank	
26-28	NUM	Number of data points	
29-80		Blank	

Second through N Cards (number of cards determined by number of data points defined on 1st card):

Col.	Mode	Description
1-13		Same as 1st card
15-17	NUM	'311'
18		Blank
19	NUM	'2' on file 23, '4' on file 24
20		Blank
21	NUM	'5' on file 23, '7' on file 24
22		Blank
23,24	NUM	Continuation card sequence number
25		Blank
26-28	NUM	Depth
29-32	NUM	BT data on file 23 Transparancy data on file 24
33-80	NUM	6 more depth/data double fields; the same as col's 26-32

File 25 Solids, Volatiles, and Oil

Col.	Mode	Description	Units
1,2		Location code	
3,4	NUM	Cruise	
5-7	NUM	Station	
8,9	NUM	Year	
10,11	NUM	Sample number	
12-17	NUM	Weight of crucible	g
18-23	NUM	Weight of crucible and sediment	g
24-29	NUM	Weight of crucible and sediment dried at 103	g
30-35	NUM	Weight of crucible and sediment dried at 600	g
36-42	NUM	Weight of beaker	g
43-49	NUM	Weight of beaker and sediment	g
50-56	NUM	Weight of flask	g
57-63	NUM	Weight of oil, grease and flask	g
64-77		Blank	
78-80	ALPH	Data identifier ('SVO')	

File 26 Chemical Oxygen Demand

Col.	Mode	Description	Units
1-11		Same as file 25	
12-18	NUM	Weight of flask	g x 10^4
19-25	NUM	Weight of flask and sample	g x 10^4
26-30		Blank	
31-34	NUM	Titrant for blank	ml x 10^2
35-38	NUM	Titrant for sample	ml x 10^2
39-42		Blank	
43-46	NUM	Titrant normality	
47-51		Blank	
52-54	NUM	COD wet basis	mg/g x 10^2
56-77		Blank	
78-80	ALPH	Data identifier (COD)	

Units And Data Identifiers

For those files that have unique formats (1, 22, 25, 26), the observed units and data identifiers are listed with the formats. For all other files:

File	Data Units	Data Identifiers
2	Meters	M
3	Degrees C x 10^2	TEMP

File	Data Units	Data Identifiers (Cont'd)
4	mg/1 x 10	NA
5	mg/1	SO4
6	mg/1 x 10_3	PO4
7	mg/1 x 10_2	CA
8	mg/1 x 10_2	MG
9	mg/1 x 10^2	K
10	mg/1 x 10	NO3
11	mg/1 x 10	SIO
12	mg/1 x 10	CL
13	pH units $x_3 10^2$	PH
14	Volts x 10^3	EH
15	mg/1 x 10	PAK
16	mg/1	TAK
17	micromhos/cm	SPC
18	mg/1 x 10^2	DO
19	Percent	DO %
20	pH units $x_3 10^2$	BPH
21	Volts x 10^3	BEH
23,24	Meters (depth)	-
23	Degrees C x 10^2	-
24	Percent	-

Miscellaneous

-1 is code for no data in all files except files 3, 14, and 21, wher 9999 is the no-data code.

45. *Mapping of Standing Water and Terrain Conditions With Remote Sensor Data*

Principal Investigator: F. C. Polcyn - ERIM

Task completed.

46. *Remote Sensing Program for the Determination of* Cladophora *Distribution*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

47. *Remote Sensing Study of Suspended Inputs Into Lake Ontario*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

48. *Island-Land Precipitation Data Analysis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Documentation of the review of tower and island data was completed and is available from the IFYGL Archive. A report on the data collected by the eastern Lake Ontario precipitation network is almost finished. The indicator equations for the U.S. basin have been developed and appear to be excellent predictors statistically. However, preliminary verification with independent data sets does not seem as promising as the statistics.

49. *Lake Circulation, Including Internal Waves and Storm Surges*

Principal Investigator: D. B. Rao - GLERL/NOAA

No progress during this quarter.

50. *Atmospheric Water Balance*

Principal Investigator: E. M. Rasmusson - CEDDA/NOAA

For a 15-day span during the second intensive period, 1200 GMT, October 30, to 1200 GMT, November 14, 1972, we have computed a lake-averaged evaporation minus precipitation rate (E-P) of 1.53 mm/day. Using an almost finalized estimate by Wilson of a precipitation rate of 4.83 mm/day, we computed an evaporation rate of 6.36 mm/day for the time period. Since the precipitation rate accounts for 75 percent of our result, we are waiting for Wilson's final estimate and also a discussion of likely errors in that estimate.

Calculations for the first intensive period (October 2 to October 18) have been examined. There appear to be no major errors in the data. However, an examination of data from the third intensive period showed anomalous behavior of E-P estimates for December 6, 1972, due primarily to a large amount of missing data, coupled with a rapidly changing physical situation. We will not include this period in our final averages.

Various minor causes of error were explored. A random error of up to $\pm$10 percent was introduced into the specific humidity and the wind components. Our smoothing technique, the asymptopic singular decomposition (ASD) method, was then run on the data and E-P computed. For the second intensive period, the period average of E-P differed by less than 0.1 mm/day from the original estimate. We also noticed that individual values of the 3-hourly time series of E-P is controlled largely by changes in the water-vapor content. Instead of using a straight arithmetic average of q for the six stations, we used the Thiessen polygon technique to compute our lake-averaged q. The more sophisticated technique made very little difference in the variability of the 3-hourly values.

During the next quarter we hope to obtain final results for all three intensive periods.

51. *Evaporation Synthesis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

First-cut evaporation data are being received from other tasks.

52. *Groundwater Flux and Storage*

Principal Investigator: E. C. Rhodehamel - U.S. Geological Survey

Task completed.

53. *Spring Algal Bloom*

Principal Investigator: A. Robertson - GLERL/NOAA

This task has been canceled.

54. *Ice Studies for Storage Term - Energy Balance*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Task completed.

55. *Lagrangian Current Observations*

Principal Investigator: J. H. Saylor - GLERL/NOAA

No activity this quarter.

56. *Circulation of Lake Ontario*

Principal Investigator: J. H. Saylor - GLERL/NOAA

No activity this quarter.

57. *Phytoplankton Nutrient Bioassays in the Great Lakes*

Principal Investigator: C. Schelske - University of Michigan

Task not activated.

58. *Runoff Term of Terrestrial Water Budget*

Principal Investigator: G. K. Schultz - U.S. Geological Survey

Task completed.

59. *Coastal Chain Program*

Principal Investigator: J. T. Scott - State University of New York at Albany

No progress this quarter.

60. *Analysis of Phytoplankton Composition and Abundance*

Principal Investigator: E. F. Stoermer - University of Michigan

Task completed.

61. *Clouds, Ice, and Surface Temperature*

Principal Investigator: A. E. Strong - NESS/NOAA

Task completed.

62. *Analysis and Model of the Impact of Discharges From the Niagara and Genesee Rivers on Nearshore Biology and Chemistry*

Principal Investigator: R. A. Sweeney - State University of New York at Buffalo

Task completed.

63. *NCAR/DRI - Buffalo Program*

Principal Investigator: J. W. Telford - Desert Research Institute, University of Nevada

No report.

64. *Mathematical Modeling of Eutrophication of Large Lakes*

Principal Investigator: R. V. Thomann - Manhattan College

No report.

65. Cladophora *Nutrient Bioassay*

Principal Investigator: G. F. Lee - University of Texas at Dallas

A final report has been submitted to the EPA Grosse Ile Laboratory.

66. *Sediment Oxygen Demand*

Principal Investigator: N. A. Thomas - EPA

A draft of the final report was completed.

67. *Main Lake Macrobenthos*

Principal Investigator: N. A. Thomas - EPA

No progress this quarter.

68. *Exploration of Halogenated Hazardous Chemicals in Lake Ontario*

Principal Investigators: G. F. Lee - University of Texas at Dallas
C. L. Haile - University of Wisconsin

Task completed.

69. *Basin Precipitation - Land and Lake*

Principal Investigator: J. W. Wilson - CEM

A report, entitled "Radar-Gage Precipitation Measurements During the IFYGL," was prepared during the quarter. It will be distributed about November 1. The report contains (1) a description of procedures used to obtain the precipitation measurements; (2) daily precipitation measurements for Lake Ontario and the watershed for the entire Field Year; (3) maps of the precipitation distribution for each month, season, and selected major storms; and (4) accuracy estimates for the resulting precipitation measurements.

Preparation of the computer-drawn precipitation maps for the IFYGL Atlas was delayed until compatibility with other maps in the Atlas could be considered. The maps are now in production. Many of them will be included in the report cited above. The Calcomp plotter at the National Severe Storms Laboratory is being used to prepare these maps.

Material was received during September from several investigators for inclusion in Volume 3 of IFYGL Scientific Report No. 2. This report, which will summarize all precipitation measurements during IFYGL, will be prepared during the next quarter.

70. *Evaluation of ERTS Data for Certain Hydrological Uses*

Principal Investigators: D. R. Wiesnet and D. F. McGinnis - NESS/NOAA

Task completed.

71. *Distribution, Abundance, and Composition of Invertebrate Fish Forage Organisms in Lake Ontario*

Principal Investigator: R. F. Heberger, Jr. - Great Lakes Fisheries Laboratory

Work is complete and the final report is in review.

72. *Coastal Circulation in the Great Lakes*

Principal Investigator: G. T. Csanady - Woods Hole Oceanographic Institution

No report.

73. *Lake Water Characteristics*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Work is complete with data having been provided to the Principal Investigator on Task 7.

74. *Snow Observation Network*

Principal Investigator: Robert B. Sykes, Jr. - State University of New York at Oswego

Task completed.

75. *Lake Circulation Model*

Principal Investigator: J. R. Bennett - Massachusetts Institute of Technology

Modeling of the summer circulation of Lake Ontario is continuing. To date the model does not realistically simulate either the mean circulation or the large transients. However, the following progress has been made:

(1) The three-dimensional model has been modified so that the horizontal resolution is variable. The minimum resolution near the shores is now approximately 1 km. This modification required the development of a horizontal eddy viscosity that damps only divergent motion and allows thin shear zones to occur near shore. The ordinary form of horizontal smoothing would have required a large coefficient to counteract the errors due to averaging the Coriolis force over four points. This form, which can be called a "horizontal bulk viscosity", has little effect on the slow, quasi-geostrophic edge waves but strongly damps the small-scale vertical motions.

(2) The model has been completely linearized so that the effects of the forcing functions could be sorted out. Steady-state solutions have been computed for eastward and northward wind stresses, river inflow, and a mean temperature distribution and then added in various combinations. The model compares favorably with the earlier version but is much easier to understand.

(3) Cross-section model simulations have been run for July 21 to 25, 1972, to try to simulate the coastal chain data. With the effects of momentum advection and the asymmetry of the north and south shores included, an analysis has been made of the longshore momentum budget to try to understand why the flow near the south shore is so much stronger than that near

the north shore. Most of this is concluded to be due to the initial condition and cannot be explained by storm processes. A report has been submitted to the Proceedings of the Symposium on Transport Modeling. The symposium was held at CCIW on October 6-8, 1975.

76. *Lake Ontario Invertebrate Fauna List*

Principal Investigator: A. Robertson - GLERL/NOAA

Distributional information is being added.

77. *Distribution and Variability of Physical Lake Properties*

Principal Investigator: R. Pickett - GLERL/NOAA

The monthly mean surface temperatures of Lake Ontario in 1972 show the impact of both the seasonal cycle and the wind. The seasonal cycle, if undisturbed, would align the surface isotherms of the lake concentrically like growth rings in a tree. Spring warming would produce warmer water, and autumn cooling colder water, nearshore. The wind, on the other hand, through Ekman drift, tends to push warm water to its right and expose cool water to its left. As a result, surface isotherms tend to align parallel with the prevailing wind.

These processes can be seen in the monthly mean surface temperatures (figs. 3 to 9). Starting in April, the lake is nearly isothermal. By May, spring warming has elevated the surface temperature -- but not uniformly. Nearshore water is warmer, and the Niagara River is injecting 8°C water. Moderate winds with a mean speed of only 2 m s^{-1} have had little impact. In June warming is extreme, and the mean surface temperature is up to 9°C. Again, moderate and variable winds allowed this warming to proceed undisturbed to produce an annular pattern. By July, both seasonal warming and the wind are at work on the lake. The surface mean temperature is up to 18°C, but a 3 m s^{-1} prevailing southwest wind has driven the cool core toward the east, and started to align the isotherms in the western end of the lake with the wind. In August the wind dominates. Warming was only 1°C from July (from 18 to 19°C), the cool core is nearly gone, and isotherms run mainly east-west. September has even stronger winds (4 m s^{-1} mean) along with a slight cooling from 19 back to 18°C. By October, cooling is very strong and the mean surface temperature has dropped from 18 to 13°C. However, the wind is so strong at 5 m s^{-1} that it still tends to dominate, although a warm region does exist in the northeast.

These mean temperature fields do not compare very favorably with the same monthly means prepared from airborne radiation thermometer data (M. S. Webb, "Mean Surface Temperatures of Lake Ontario During the IFYGL," Proceedings of the 17th Conference on Great Lakes Research, 1974, pp. 471-482), and direct comparisons between the two methods show significant differences (R. L. Pickett and S. Bermick, "Comparison of Airborne Radiation Thermometer and Buoy Temperature Measurements," IFYGL Bulletin No. 14, p. 76). The radiation thermometers measured skin temperatures

modified by the intervening atmosphere, while the buoy network measured bulk temperatures just below the lake surface.

Calculated currents corresponding to the monthly mean temperature patterns were shown in IFYGL Bulletin No. 15 (pp. 82-88). Since several requests for these data have been received, they are listed in full in tables 2 through 8, which give monthly resultant currents for all meters that operated for more than 100 hr each month.

78. *Carbon Cycle Model*

Principal Investigators: A. Robertson and B. Eadie - GLERL/NOAA

Documentation is continuing.

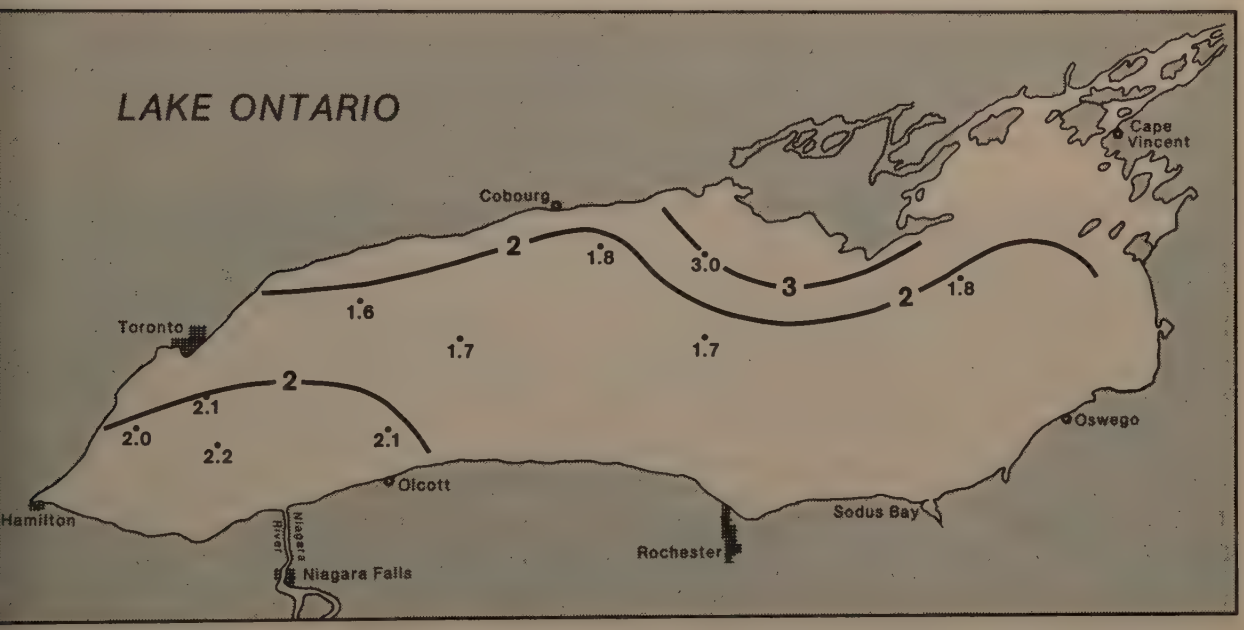

Figure 3.--Lake Ontario mean surface water temperature in April 1972.

Figure 4.--Lake Ontario mean surface water temperature in May 1972.

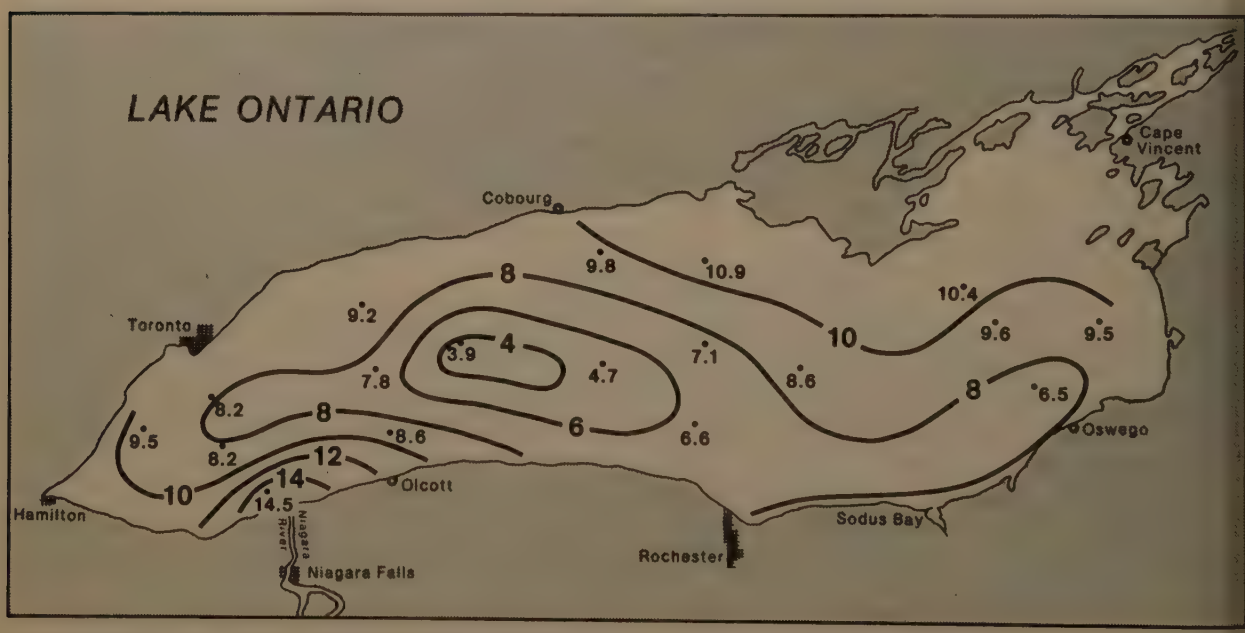

Figure 5.--Lake Ontario mean surface water temperature in June 1972.

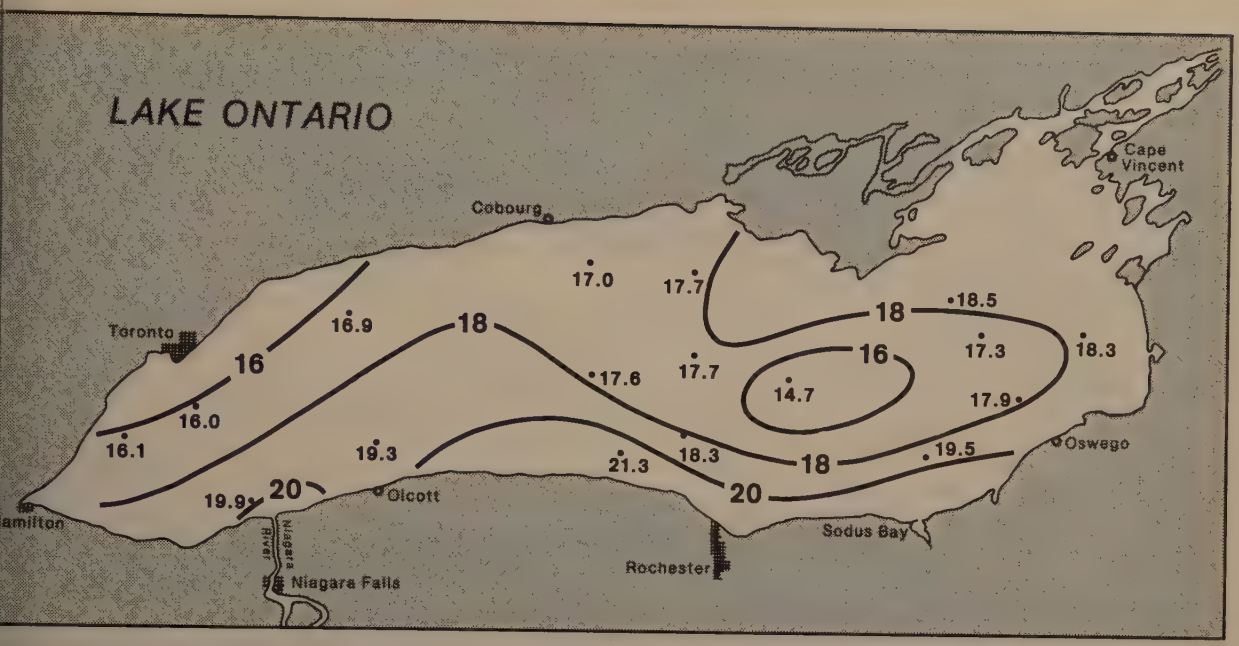

Figure 6.--Lake Ontario mean surface water temperature in July 1972.

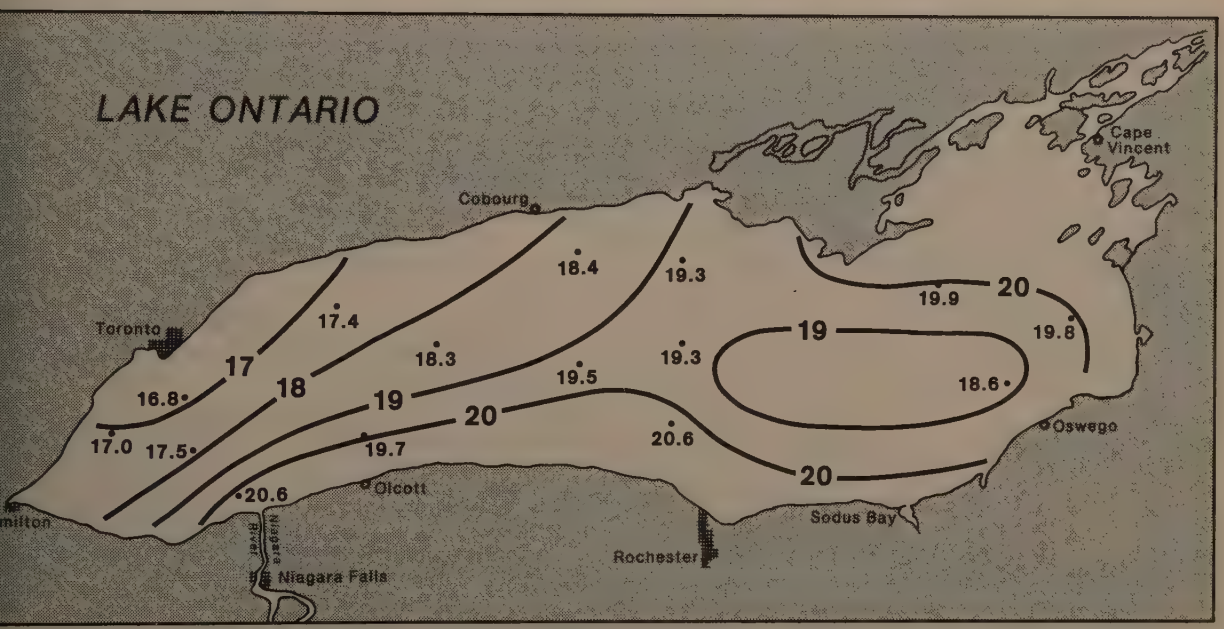

Figure 7.--Lake Ontario mean surface water temperature in August 1972.

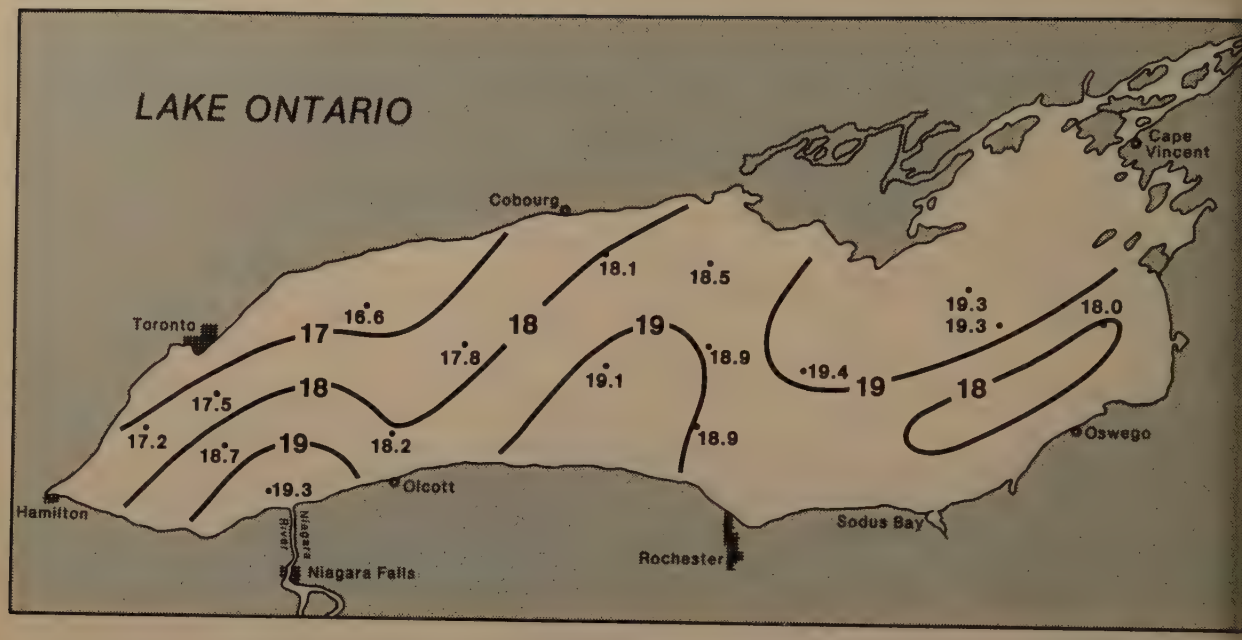

Figure 8.--Lake Ontario mean surface water temperature in September 1972.

Figure 9.--Lake Ontario mean surface water temperature in October 1972.

Table 2.--May monthly resultant currents

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)					1.4		1.9	1.5	
	Direction (°)					036		041	045	
3	Speed (cm/s)				0.3	0.8		0.1		
	Direction (°)				171	254		345		
4	Speed (cm/s)				1.2	0.4		0.3	0.7	
	Direction (°)				046	319		326	335	
5	Speed (cm/s)				0.9	0.7				
	Direction (°)				273	045				
6	Speed (cm/s)				2.4	0.3		1.0	1.1	
	Direction (°)				304	265		352	076	
8	Speed (cm/s)					1.6		1.5		
	Direction (°)					072		084		
9	Speed (cm/s)				0.9	1.1		1.1	1.0	
	Direction (°)				159	142		107	161	
10	Speed (cm/s)				1.1	1.5		1.5	1.1	
	Direction (°)				174	182		173	169	
11	Speed (cm/s)				2.0	1.5		2.0	2.0	
	Direction (°)				299	296		294	302	
16	Speed (cm/s)			0.6		1.5		1.2		0.7
	Direction (°)			293		291		299		304
26	Speed (cm/s)	2.3		1.3	0.1	0.5	0.8			
	Direction (°)	301		293	145	208	109			
32	Speed (cm/s)				3.1					
	Direction (°)				263					
34	Speed (cm/s)				2.0					
	Direction (°)				280					
38	Speed (cm/s)				1.2					
	Direction (°)				272					
41	Speed (cm/s)				0.8					
	Direction (°)				274					

Table 2.--May monthly resultant currents (continued)

Station No.		Depth (m)							
		2	4	5	10	15	19	30	50	3 off bottom
55	Speed (cm/s)				2.8					
	Direction (°)				285					
59	Speed (cm/s)				0.9					
	Direction (°)				330					

Table 3.--June monthly resultant currents

Station No.		Depth (m)							
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)					1.1		2.1	1.2	
	Direction (°)					048		026	024	
3	Speed (cm/s)				0.4	0.3		0.8		
	Direction (°)				130	333		322		
4	Speed (cm/s)				2.0			1.6	1.6	
	Direction (°)				058			051	051	
5	Speed (cm/s)					0.8				
	Direction (°)					201				
6	Speed (cm/s)					0.2		0.8	4.7	
	Direction (°)					080		032	083	
8	Speed (cm/s)					1.0		1.1		
	Direction (°)					235		173		
9	Speed (cm/s)				1.0	1.5		0.6	1.3	
	Direction (°)				081	092		119	057	
10	Speed (cm/s)				0.4	0.4		0.7	0.6	
	Direction (°)				269	109		156	118	
11	Speed (cm/s)				3.4	1.7		0.7	0.3	
	Direction (°)				279	247		143	155	
12	Speed (cm/s)			1.0		0.2		0.4		0.1
	Direction (°)			304		085		062		052

Table 3.--June monthly resultant currents (continued)

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
3	Speed (cm/s)			3.9		2.6		1.2		1.0
	Direction (°)			077		084		252		080
4	Speed (cm/s)			1.5		2.8		0.3		0.3
	Direction (°)			253		137		308		249
6	Speed (cm/s)			0.5		0.5		0.6		0.0
	Direction (°)			121		044		076		128
7	Speed (cm/s)			0.4		1.1		0.7		0.1
	Direction (°)			102		111		055		061
9	Speed (cm/s)			0.5		0.4		0.7		0.3
	Direction (°)			244		237		180		179
0	Speed (cm/s)			1.2		0.7		1.2		0.3
	Direction (°)			262		227		231		215
1	Speed (cm/s			06.1		3.7		1.2		1.2
	Direction (°)			052		047		063		046
4	Speed (cm/s)	1.4	1.6							
	Direction (°)	095	075							
6	Speed (cm/s)	13.5		14.4	0.2		4.6			
	Direction (°)	094		093	062		130			
7	Speed (cm/s)	2.7	1.4							
	Direction (°)	062	091							
6	Speed (cm/s)				2.1					
	Direction (°)				237					
1	Speed (cm/s)				0.9					
	Direction (°)				264					
5	Speed (cm/s)				5.3					
	Direction (°)				279					
9	Speed (cm/s)				2.3					
	Direction (°)				114					

Table 4.--July monthly resultant currents

Station No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)				3.1	2.7		2.7	0.2	
	Direction (°)				028	022		034	251	
3	Speed (cm/s)				0.2	0.3				
	Direction (°)				300	167				
4	Speed (cm/s)				1.8	1.9		0.8	1.1	
	Direction (°)				094	073		102	234	
5	Speed (cm/s)					1.6				
	Direction (°)					059				
6	Speed (cm/s)				1.3	1.5		2.1	0.4	
	Direction (°)				282	263		057	358	
8	Speed (cm/s)				7.7	1.4		0.8		
	Direction (°)				262	292		277		
9	Speed (cm/s)				0.8	1.5		1.6	1.6	
	Direction (°)				132	325		318	325	
10	Speed (cm/s)				2.8	2.1		0.9	0.3	
	Direction (°)				347	322		304	313	
11	Speed (cm/s)				2.7	2.1		2.4	2.1	
	Direction (°)				273	263		268	291	
13	Speed (cm/s)			3.8		0.7		0.2		0.7
	Direction (°)			111		038		314		277
14	Speed (cm/s)			0.1				0.2		0.2
	Direction (°)			281				225		295
15	Speed (cm/s)							1.0		
	Direction (°)							101		
16	Speed (cm/s)			1.8		0.5		0.5		0.1
	Direction (°)			125		020		360		084
17	Speed (cm/s)			0.0		0.4		0.1		0.1
	Direction (°)			109		087		164		198
18	Speed (cm/s)							0.3		
	Direction (°)							271		

Table 4.--July monthly resultant currents (continued)

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
19	Speed (cm/s)					0.6		0.3		0.2
	Direction (°)					264		304		263
20	Speed (cm/s)			3.6		0.2		0.4		0.5
	Direction (°)			008		042		048		036
21	Speed (cm/s)			1.1		1.1		0.1		0.1
	Direction (°)			022		001		131		290
23	Speed (cm/s)				0.8	0.4	1.0			
	Direction (°)				050	057	059			
24	Speed (cm/s)	1.0	0.6							
	Direction (°)	067	188							
26	Speed (cm/s)	10.5		11.2	0.1	2.1	0.9			
	Direction (°)	100		099	091	031	108			
27	Speed (cm/s)	3.1	0.9							
	Direction (°)	092	110							
32	Speed (cm/s)				1.3					
	Direction (°)				243					
34	Speed (cm/s)				0.4					
	Direction (°)				287					
36	Speed (cm/s)				1.4					
	Direction (°)				064					
41	Speed (cm/s)				0.6					
	Direction (°)				092					
55	Speed (cm/s)				3.5					
	Direction (°)				281					

Table 5.--August monthly resultant currents

Station No.		Depth (m)								3 off bottom
		2	4	5	10	15	19	30	50	
2	Speed (cm/s)				1.8	5.6		1.5	1.9	
	Direction (°)				238	036		019	068	
3	Speed (cm/s)				1.8	1.4		2.4		
	Direction (°)				293	295		263		
4	Speed (cm/s)				0.7	1.9		2.1	1.1	
	Direction (°)				037	072		274	300	
5	Speed (cm/s)				4.9	2.0				
	Direction (°)				075	051				
6	Speed (cm/s)				2.3	3.9		2.4	1.3	
	Direction (°)				084	069		065	119	
8	Speed (cm/s)				6.7	1.7		0.5		
	Direction (°)				070	010		048		
9	Speed (cm/s)				3.7	3.5		1.2	0.8	
	Direction (°)				309	319		075	069	
10	Speed (cm/s)				2.5	1.7		1.5	0.3	
	Direction (°)				012	020		016	312	
11	Speed (cm/s)				2.9	1.8			2.6	
	Direction (°)				257	270			268	
12	Speed (cm/s)			1.2		0.6		1.4		1.4
	Direction (°)			235		314		315		299
13	Speed (cm/s)			0.0				0.4		0.2
	Direction (°)			057				170		199
14	Speed (cm/s)			0.2				0.2		0.9
	Direction (°)			196				279		253
15	Speed (cm/s)							1.6		
	Direction (°)							098		
16	Speed (cm/s)			0.7		0.9		0.8		0.8
	Direction (°)			141		239		066		028
17	Speed (cm/s)			0.0		7.1		0.5		0.0
	Direction (°)			318		355		200		292

Table 5.--August monthly resultant currents (continued)

Station No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
20	Speed (cm/s)			13.4		2.3		2.0		0.2
	Direction (°)			061		070		071		093
21	Speed (cm/s)			9.1		8.5		0.9		0.2
	Direction (°)			058		087		135		026
23	Speed (cm/s)				1.2	1.8	3.5			
	Direction (°)				142	134	070			
24	Speed (cm/s)	0.5	0.7							
	Direction (°)	294	219							
26	Speed (cm/s)	6.4		7.7	2.1	8.0	3.1			
	Direction (°)	081		088	270	338	155			
27	Speed (cm/s)	0.9	1.3							
	Direction (°)	052	107							
32	Speed (cm/s)				3.2					
	Direction (°)				243					
34	Speed (cm/s)				4.5					
	Direction (°)				239					
36	Speed (cm/s)				5.8					
	Direction (°)				063					
41	Speed (cm/s)				1.5					
	Direction (°)				352					
55	Speed (cm/s)				5.2					
	Direction (°)				327					
59	Speed (cm/s)				6.6					
	Direction (°)				022					

Table 6.--September monthly resultant currents

Station No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)					1.5		1.8	1.0	
	Direction (°)					331		018	281	
3	Speed (cm/s)				2.2	2.4		0.8		
	Direction (°)				018	013		053		
4	Speed (cm/s)				1.7	2.3		2.8	2.4	
	Direction (°)				114	064		068	056	
5	Speed (cm/s)				5.3	3.8				
	Direction (°)				095	093				
6	Speed (cm/s)				0.5	0.7		1.0	1.2	
	Direction (°)				180	120		077	281	
8	Speed (cm/s)				0.8	2.2				
	Direction (°)				056	008				
9	Speed (cm/s)				1.6			1.8	1.1	
	Direction (°)				116			359	030	
11	Speed (cm/s)				1.6	1.3		1.7	0.1	
	Direction (°)				260	284		074	303	
12	Speed (cm/s)			0.8		0.2		0.5		0.6
	Direction (°)			003		129		233		301
13	Speed (cm/s)			0.0				0.7		1.3
	Direction (°)			350				112		082
14	Speed (cm/s)			2.6		2.0				0.4
	Direction (°)			270		307				093
16	Speed (cm/s)			0.3		1.6		0.5		0.5
	Direction (°)			014		047		034		056
17	Speed (cm/s)			4.3		13.7		1.5		1.8
	Direction (°)			018		033		327		346
19	Speed (cm/s)					0.0		1.1		0.1
	Direction (°)					218		240		236
20	Speed (cm/s)			0.1		3.1		0.1		0.1
	Direction (°)			046		096		139		048

Table 6.--September monthly resultant currents (continued)

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
21	Speed (cm/s)			6.1		1.9		0.1		0.1
	Direction (°)			102		040		250		223
23	Speed (cm/s)				2.8	1.7	2.8			
	Direction (°)				084	103	071			
24	Speed (cm/s)	0.8	0.8							
	Direction (°)	047	084							
26	Speed (cm/s)	3.9		7.2	7.7	10.4	5.2			
	Direction (°)	273		294	272	290	237			
27	Speed (cm/s)	1.1	1.3							
	Direction (°)	025	094							
36	Speed (cm/s)				8.1					
	Direction (°)				264					
41	Speed (cm/s)				7.4					
	Direction (°)				259					
55	Speed (cm/s)				5.0					
	Direction (°)				297					
59	Speed (cm/s)				6.7					
	Direction (°)				293					
69	Speed (cm/s)				9.9					
	Direction (°)				256					

Table 7.--October monthly resultant currents

ation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)					1.5		2.8	3.3	
	Direction (°)					219		041	028	
3	Speed (cm/s)				4.3	2.5		1.9		
	Direction (°)				174	202		327		

Table 7.--October monthly resultant currents (continued)

Station No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
4	Speed (cm/s)				8.2	4.1		1.8	2.1	
	Direction (°)				086	099		062	276	
5	Speed (cm/s)				3.7	2.8				
	Direction (°)				097	077				
6	Speed (cm/s)				4.4	4.2		6.1	2.3	
	Direction (°)				164	216		061	127	
8	Speed (cm/s)				3.5	4.5				
	Direction (°)				202	238				
9	Speed (cm/s)				5.3	0.8		1.5	2.4	
	Direction (°)				149	252		009	014	
10	Speed (cm/s)					0.2				
	Direction (°)					011				
11	Speed (cm/s)				1.5	6.1		2.7	3.3	
	Direction (°)				056	261		285	274	
13	Speed (cm/s)							0.4		3.1
	Direction (°)							338		238
14	Speed (cm/s)			1.0		2.2				4.7
	Direction (°)			159		218				279
16	Speed (cm/s)			0.1		0.9		0.2		1.7
	Direction (°)			124		102		169		329
19	Speed (cm/s)			0.0		0.1		2.8		0.3
	Direction (°)			057		183		247		265
20	Speed (cm/s)			0.0		1.5		0.7		0.6
	Direction (°)			028		339		355		082
21	Speed (cm/s)			1.2		0.9		1.3		0.4
	Direction (°)			071		131		208		313
23	Speed (cm/s)			17.9	6.8	3.4	2.6			
	Direction (°)			081	072	101	084			
24	Speed (cm/s)	1.4	1.9							
	Direction (°)	0.45	119							

Table 7.--October monthly resultant currents (continued)

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
26	Speed (cm/s)	4.3		6.6	7.8	7.5	5.7			
	Direction (°)	104		327	269	317	194			
27	Speed (cm/s)	2.7	4.1							
	Direction (°)	030	094							
36	Speed (cm/s)				4.5					
	Direction (°)				104					
41	Speed (cm/s)				2.3					
	Direction (°)				195					
55	Speed (cm/s)				0.7					
	Direction (°)				294					
59	Speed (cm/s)				3.1					
	Direction (°)				252					
69	Speed (cm/s)				2.6					
	Direction (°)				171					
71	Speed (cm/s)					0.7				
	Direction (°)					032				

Table 8.--November monthly resultant currents

tation No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
2	Speed (cm/s)					5.0				
	Direction (°)					249				
4	Speed (cm/s)					11.9				
	Direction (°)					062				
6	Speed (cm/s)					11.5				
	Direction (°)					253				
9	Speed (cm/s)					2.8				
	Direction (°)					318				

Table 8.--November monthly resultant currents (continued)

Station No.		Depth (m)								
		2	4	5	10	15	19	30	50	3 off bottom
10	Speed (cm/s)					6.0				
	Direction (°)					286				
11	Speed (cm/s)					2.7				
	Direction (°)					016				
16	Speed (cm/s)			0.1		1.8				1.8
	Direction (°)			080		103				090
26	Speed (cm/s)	5.2		3.9	2.3	4.9	6.5			
	Direction (°)	083		072	096	064	120			
27	Speed (cm/s)	0.3	1.8							
	Direction (°)	219	315							
41	Speed (cm/s)				11.9					
	Direction (°)				259					
59	Speed (cm/s)				2.5					
	Direction (°)				284					
71	Speed (cm/s)					8.5				
	Direction (°)					184				

DATA MANAGEMENT - IFYGL ARCHIVE

Most of the data to be archived in the form of magnetic tapes and microfilms are now in the IFYGL Archive and copies can be ordered. As expected, published reports are being completed at a slower rate; about one-half have been received.

All material for the Physical Data Collection System (PDCS, USA Task 100) is in the Archive except the system documentation, which is yet to be published. Data are for 10 buoys, 4 overwater towers, and 6 land stations. Periods of record vary, but are generally May 1972 through March 1973 for the land stations, and June through October 1972 for the buoys and towers. Magnetic tape data can be ordered for either 6-min or hourly intervals. Similar data on microfilm can be obtained as either computer listings or computer graphics.

Magnetic tape data for the cruises of the Researcher and the Advance II can be ordered for 1-s intervals or 6-min averages (USA Tasks 101 and 102). To aid in using the data, computer output on microfilm (COM) listings have been prepared for the 1-s data. These will not be archived permanently, but are held temporarily. Sets can be viewed at the Great Lakes Environmental Research Laboratory (Ann Arbor, Michigan), the Center for Experiment Design and Data Analysis (Washington, D.C.), and the National Climatic Center (Asheville, North Carolina). Each microfilm corresponds to one magnetic tape, and there are 587 altogether.

A readout has been made of the IFYGL biological and chemical data in EPA's STORET computer information system (USA Task 110). Orders can be placed for the data on magnetic tapes (5), or microfiche (17). A description of the data formats and examples from the microfiche will be given in a future issue of the IFYGL Bulletin.

Tables 9 and 10 show the availability of IFYGL data, and carry the following information:

TASK NO. - The task numbers used for project identification.

INVESTIGATOR - Principal Investigator's name. The line numbers contained in the column identify groups of data. Line numbers not shown here relate to data collected but not placed in the final IFYGL Archive.

DESCRIPTION OF DATA - The underlined words are abbreviated task titles. The data or reports are described briefly.

MEDIA - These are not the media in which the data were received from the investigator, but are the media in which the data will be archived. In the United States final Archive, data will be preserved and distributed in the forms of magnetic tapes (digitized data), microfiche (reports), and microfilm (data that will not fit the other two media). Punched cards and papers will be converted to one of the preceding media for permanent

retention, but will be retained for convenience until their usefulness has passed.

DATA AVAILABLE FROM INVESTIGATOR - Data on hand are identified ("At NCC") and estimated dates are given for the remaining data. "Now" means that the data are on hand at the Principal Investigator's location.

ARCHIVE - This tells the disposition of the data as follows:

Y - Yes - The data will be archived permanently.

YC - Yes - Copy to Canadian Data Bank. The data will be archived permanently and Canada has requested a copy for filing.

T - Temporary Archive. Data will be held until their usefulness is believed over.

PI - Principal Investigator. Data will be kept by the Principal Investigator, who should be contacted if the data are needed.

Requests for data should be directed to:

IFYGL Data Manager, Room 17
National Climatic Center, EDS, NOAA
Federal Building
Asheville, NC 28801

Telephone: 704 258-2850, ext. 754; FTS 672-0754

Table 9.--Summary of data available from final IFYGL Archive: United States

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		ATMOSPHERIC BOUNDARY LAYER			
3	Bean		RFF/DC-6 (Gust Probe)			
		3.	Reduced turbulence data - Binary	Mag Tape	At NCC	Y
		4.	Computed flux, Time series spectra	Microfilm	At NCC	YC
		5.	Time series graphics(U,V,W,T,PV)	Microfilm	At NCC	YC
		6.	Means, Variances and Fluxes	Microfilm	At NCC	YC
		7.	Plots of Flight Paths	Microfiche	At NCC	YC
		8.	Spatial-Temporal Variations in Turbulence Fluxes	Microfiche	At NCC	YC
5	Businger		Profile Mast and Tower			
		5.	Computed profile & Flux data, 15 minute and hourly averages	Mag Tape	At NCC	YC
		6.	Final Report	Microfiche	Dec 1975	YC
14	Estoque		Boundary Layer Structure			
		1.	Land Met. Stations - Surface Met. Data	Strip Chart	Now	PI
		3.	Tethered balloon (BLIP)	Microfilm	At NCC	YC
		6.	NCAR Queen Air ACFT - Processed data listing - 1 sec. sample rate	Microfilm	Now	PI
		7.	PIBAL observations-wind components	Microfilm	At NCC	YC
		8.	Cloud Cover Photography - Time lapse	16MM Film	Now	PI
		9.	Cloud Cover Photography - Still	Negatives	Now	PI
15	Estoque		Mesoscale Simulation Studies			
		1.	Annual Report - Content of Mesoscale Disturbances by Synoptic Conditions	Microfiche	At NCC	YC
		2.	Final Report	Microfiche	June 1976	YC
20	Almazan		Boundary Layer Flux Synthesis			
		1.	Final Report	Microfiche	June 1976	YC
38	Panofsky		Turbulence-Niagara Bar Tower			
		3.	Reduced wind speed fluctuations	Mag Tape	Now	PI
		5.	Two-Point Statistics over Lake Ontario	Microfiche	At NCC	YC
63	Telford		NCAR/DRI Aircraft			
		2.	Reduced data - Gust probe, met sensors	Mag Tape	Now	PI
		3.	Reduced data - (Time, location, U, V, W, temperature, dew point, pressure)	Mag Tape	Now	PI
		4.	Reduced data, Calcomp Plot - Aircraft Track 6-sec. wind vectors	Sheets	Now	PI
		5.	Final data report-Computed fluxes of momentum, heat, vapor (1/minute)	Microfiche	Oct 1975	YC
		6.	Final Report	Microfiche	June 1976	YC
	PANEL		BIOLOGY - CHEMISTRY			
1	Armstrong		Sediment Analysis			
		2.	Phosphorus Uptake-Release by Sediments	Microfiche	At NCC	YC
4	Burris		Water Sample - Analysis			
		2.	Final Report	Microfiche	At NCC	YC
6	Kutkuhn		Status of Fish Population			
		1.	Fish samples-Size,Numbers,Scale collections (From punched cards)	Mag Tape	At NCC	YC
		2.	Fish samples-Size,Numbers,Scale collections (From punched cards)	Listing	At NCC	T
		3.	Water temperature (BT) (From punched cards)	Mag Tape	At NCC	YC
		4.	Digitized BT, 5 Fathoms	Listing	At NCC	T

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		BIOLOGY - CHEMISTRY (Cont'd)			
6	(Cont'd)	5.	RESEARCHER Fathometer (Echo Sounding)	Rolls	Now	PI
		6.	Final Report	Microfiche	Dec 1975	YC
7	Casey		Material Balance			
		1.	Material balance data in STORET	STORET	At NCC	Y
		3.	Final Report - Streams	Microfiche	April 1976	YC
		4.	Final Report - Main Lake	Microfiche	July 1976	YC
12	Thomas		Rochester Embayment Study			
		2.	Chemical Data	Mag Tape	Now	PI
		4.	Current speed and direction, water temperature, wind	Mag Tape	At NCC	YC
		10.	Gravity Magnetic Survey	Mag Tape	At CEDDA	PI
		11.	Researcher Fathometer Soundings	Strip Ch.	Now	PI
		12.	Final Report	Microfiche	At NCC	YC
19	Hetling		Transport of Nutrients			
		1.	Nutrient transport data in STORET	STORET	At NCC	Y
		3.	Final Report	Microfiche	April 1976	YC
21	Davies		Hazardous Material Flow			
		1.	Final Report	Microfiche	Dec 1975	YC
22	Kim		Remote Measurement of Chlorophyll			
		4.	New Algae Mapping Technique	Microfiche	At NCC	YC
26	Lee		Algal Nutrient Availability			
		3.	Final Report	Microfiche	March 1976	YC
29	McNaught		Zooplankton Production			
		1.	Zooplankton data in STORET	STORET	At NCC	Y
		4.	Acoustical Profiles	Sheets	Now	PI
		5.	Zooplankton Concentration Samples	Samples	Now	PI
		6.	Final Report	Microfiche	Oct 1975	YC
33	Moore		Nearshore Study			
		1.	Nearshore data in STORET	STORET	At NCC	Y
		5.	Final Report	Microfiche	April 1976	YC
35	Mozley		Benthos Study			
		1.	Benthos study data in STORET	STORET	At NCC	Y
		3.	EBT's-ADVANCE II, Cruise 26	Microfiche	At NCC	YC
		4.	Final Report	Microfiche	Feb 1976	YC
44	Bell		SHENEHON (Ship) Data			
		2.	Final Meteorological 6-minute, Hourly and Daily data	Mag Tape	Dec 1975	YC
		3.	Solar Radiation Incident & Reflected and Daily data	Charts	Now	PI
		5.	Chemical/digitized BT (1 meter)	Mag Tape	Sept 1975	YC
		6.	Final Report (Oswego Harbor)	Microfiche	Sept 1975	YC
46	Polcyn		Cladophora Sensing			
		1.	Cladophora Distribution	Microfiche	At NCC	YC
47	Polcyn		Suspended Sediments Sensing			
			No special report for this task. See Final Report for Task 45, Remote Sensing - Terrain -			

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	BIOLOGY - CHEMISTRY (Cont'd)			
60	Stoermer	Phytoplankton			
	1.	Phytoplankton data	STORET	At NCC	Y
	3.	Data count Pre-report	Microfiche	At NCC	YC
	4.	Data Analysis-Lakewide Changes	Microfiche	At NCC	YC
	5.	Phytoplankton Composition & Abundance	Microfiche	At NCC	YC
62	Sweeney	River Discharge Impacts			
	1.	Nearshore Bio-Chem STORET data	STORET	At NCC	Y
	6.	Final Report	Microfiche	Feb 1976	YC
64	Thomann	Eutrophication Model			
	1.	Final Report	Microfiche	June 1976	YC
66	Thomas	Sediment Oxygen Demand			
	1.	Sediment oxygen data in STORET	STORET	At NCC	Y
	4.	Final Report	Microfiche	Feb 1976	YC
67	Thomas	Lake Macrobenthos			
	1.	Distribution of Benthic Organisms	Microfiche	Feb 1976	YC
	2.	Sediment Particle Size,Composition	Microfiche	Feb 1976	YC
	3.	Final Report	Microfiche	Feb 1976	YC
68	Lee	Hazardous Chemicals			
	1.	Hazardous chemical STORET data	STORET	At NCC	Y
	5.	Final Report-Chlorinated Hydrocarbons	Microfiche	At NCC	YC
71	Heberger	Fish Forage Organisms			
	1.	Fish Food Habits Data	Pun'd Cards	At NCC	YC
	2.	Final Report	Microfiche	Nov 1975	YC
73	Pinsak	Lake Water Characteristics			
	1.	Edited Depth, Temperature, Chemical composition data	Mag Tape	At NCC	YC
76	Robertson	Fauna List			
	1.	Final Report	Microfiche	June 1976	YC
78	Robertson	Carbon Cycle Model			
	1.	Final Report - Carbon Cycle Model	Microfiche	June 1976	YC
	2.	Final Report - Carbon Budget	Microfiche	June 1976	YC
	PANEL	ENERGY BALANCE			
2	Atwater	Net Radiation			
	1.	Interim Reports	Microfiche	At NCC	YC
	2.	Net radiation data for grid	Mag Tape	At NCC	Y
	3.	Final Report	Microfiche	At NCC	YC
17	Dilley	Nearshore Ice Formation			
	2.	Meteorological data-Van (Temperature, Wind, Radiation,Pressure)	Mag Tape	At NCC	YC
	3.	Time lapse photography (Ice Formation)	Film	Now	PI
	4.	Analysis of Lake Shore Ice Formation, Growth, and Decay-IFYGL Phase 2	Microfiche	At NCC	YC
	5.	Data Report	Microfiche	At NCC	YC
18	Grumblatt	Advection Term-Energy Balance			
	2.	Water temperature,5-minute intervals	Mag Tape	At NCC	YC
	3.	Final Report	Microfiche	Jan 1976	YC
28	Lyons	Cloud Climatology			
	1.	Solar Radiation-Incident	Strip Ch.	Now	PI

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		ENERGY BALANCE (Cont'd)			
28	(Cont'd)	2.	1 Hour averages (Planimetered)	Microfiche	Oct 1975	YC
		3.	Cloud photography-Color Panorama	35 MM Film	Now	PI
		4.	Cloud photography-Color All Sky	16 MM Film	Now	PI
		5.	Cloud photography-Other	35 MM Film	Now	PI
		7.	Final Report	Microfiche	Oct 1975	YC
36	Hoffeditz		Evaporation Pan Network (US & CDN)			
		1.	Radiation, Incident LW & SW hourly totals	Pun'd Cards	Oct 1975	YC
		2.	Evaporation Pan data (US & CDN)	Pun'd Cards	Oct 1975	YC
		4.	4 Reports & Final Report	Microfiche	Oct 1975	YC
40	Piech		Lake Optical Properties			
		3.	Turbidity Measurements-Irradiance Meter/Transmissometer-graphs	Sheets	Now	PI
		4.	Turbidity Measurements - Irradiance meter/transmissometer - graphs	Microfiche	Oct 1975	YC
		5.	Documentation-Location of measurements Final Report	Microfiche	Oct 1975	YC
41	Pinsak		Lake Heat Storage			
		1.	Weekly mean water temperatures for lake cells	Microfiche	June 1976	YC
		2.	Final Report	Microfiche	June 1976	YC
42	Pinsak		Sensible & Latent Heat Flux			
		1.	Final Report	Microfiche	June 1976	YC
43	Pinsak		Lake Thermal Advection			
		1.	Final Report	Microfiche	June 1976	YC
54	Quinn		Lake Ontario Ice Studies			
		1.	Ice Thickness - Manual Measurement A. 5 sites, weekly B. Ice patterns-graphic display C. Surface meteorological data D. Albedo measurement	Microfiche	At NCC	YC
61	Strong		Satellite			
		1.	NOAA 2 VHRR Digital Tapes	Mag Tape	Sept 1975	Y
		2.	NOAA 2 VHRR Images	Film	Now	PI
		3.	Final Report-Utilizing NOAA Sat. Data	Microfiche	At NCC	YC
	PANEL		TERRESTRIAL WATER BALANCE			
8	Schutze		Runoff			
		1.	Weekly streamflow data	Microfiche	June 1976	YC
		2.	Summary Report	Microfiche	June 1976	YC
9	Schutze		Evaporation (Lake-Land)			
		1.	Weekly evaporation estimates	Microfiche	June 1976	YC
		2.	Final Report	Microfiche	June 1976	YC
10	DeCooke		Simulation Studies			
		1.	Final Report	Microfiche	June 1976	YC
11	Schutze		Lake Precipitation			
		1.	Monthly precip estimates-US Basin	Microfiche	June 1976	YC
		2.	Final Report	Microfiche	June 1976	YC
13	Embree		Soil Moisture and Snow Hydrology			
		2.	Soil moisture tabulated data (1/Month)	Microfiche	Sept 1975	YC

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		TERRESTRIAL WATER BALANCE (Cont'd)			
13	(Cont'd)	3.	Snow Depth-Water equivalent (1/Month)	Microfiche	Sept 1975	YC
		4.	Stream flow - discharge	Microfiche	Sept 1975	YC
		5.	Final Report	Microfiche	Sept 1975	YC
16	Stoughton		Lake Level Transfer			
		1.	Final Report	Microfiche	Dec 1975	YC
23	Cox		Outflow Term TWB			
		1.	Discharge St. Lawrence River	Mag Tape	At NCC	YC
		2.	Final Report	Microfiche	At NCC	YC
24	Cox		Flow Model			
		1.	Final Report	Microfiche	Dec 1976	YC
30	Wilshaw		Lake Storage Term (Water Levels)			
		2.	5-minute water levels	Mag Tape	At NCC	YC
		3.	Raw hourly water levels	Mag Tape	Nov 1975	T
		4.	Edited (Converted to common datum)hourly water levels	Mag Tape	At NCC	YC
		5.	Final Report	Microfiche	Nov 1975	YC
31	Schutze		Soil Moisture			
		1.	Weekly soil moisture data	Microfiche	June 1976	YC
		2.	Final Report	Microfiche	June 1976	YC
39	Peck		Airborne Snow Reconnaissance			
		2.	Ground Truth Data	Microfiche	At NCC	YC
		3.	Airborne Survey Water Equivalent	Microfiche	At NCC	YC
		4.	Soil moisture measurements	Microfiche	At NCC	YC
		5.	Snow cover water equivalents	Microfiche	At NCC	YC
		6.	Water equivalent - air survey	Microfiche	At NCC	YC
		7.	Final Report (Task Summary)	Microfiche	Dec 1975	YC
45	Polcyn		Remote Sensing - Terrain			
		2.	Aerial photography-Color	70 MM Film	Now	PI
		3.	Aerial photography-Black-White Prints	Film	Now	PI
		4.	Aerial photography-White Negatives	Film	Now	PI
		6.	Final Report	Microfiche	At NCC	YC
		7.	Aircraft flight data record	Microfiche	At NCC	YC
48	Quinn		Island - Land Precipitation			
		2.	Hourly precipitation amounts	Mag Tape	At NCC	YC
		3.	Precipitation - 80 NWS stations	Mag Tape	At NCC	YC
		4.	Daily Lake Ontario Basin precipitation	Microfiche	At NCC	YC
		5.	Over Lake Precipitation Report	Microfiche	June 1976	YC
		6.	Over Land Precipitation Report	Microfiche	At NCC	YC
51	Quinn		Evaporation Synthesis			
		1.	Final Report	Microfiche	June 1977	YC
52	Rhodehamel		Groundwater Wells			
		2.	Water levels analog-continuous	Strip Ch.	Now	PI
		3.	Summary (chronological list)	Microfiche	Oct 1975	YC
		4.	Final Report	Microfiche	June 1976	YC
58	Schultz		Runoff			
		1.	Tributary stage levels - strip charts (4 USGS gages)	Microfilm	At NCC	YC
		2.	Tributary stage levels observations 15 minute-digital USGS gages	Mag Tape	Oct 1975	YC
		3.	Tributary stage levels - daily data	Mag Tape	Now	PI
		4.	Tributary stage levels	Pun'd Cards	At NCC	YC

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		TERRESTRIAL WATER BALANCE (Cont'd)			
58	(Cont'd)	5.	Mean weekly flow	Microfiche	At NCC	YC
		6.	Tributary stage & discharge, 35 miscellaneous sites-intermittent	Microfiche	At NCC	YC
		7.	N.Y. State Barge Canal data	Microfiche	At NCC	YC
		8.	Final Report	Microfiche	Sept 1975	YC
69	Wilson		Radar and Precipitation Gage Network			
		1.	Raw radar data-returned echo intensity-compacted	Mag Tape	Now	PI
		3.	Photographs of radar scope	Microfilm	At NCC	Y
		4.	Daily total precipitation amounts including precipitation gage data	Mag Tape	At NCC	YC
		5.	Radar Documentation	150 Pages	At NCC	T
		6.	Oswego Radar Event Logs	300 Pages	At NCC	T
		7.	Raw precipitation data-Rochester precipitation network	Paper Tape	At NCC	T
		8.	Documentation-Rochester Precip. network observers logs	600 Pages	At NCC	T
		10.	Precipitation data - Rochester Network	Mag Tape	At NCC	YC
		11.	Precipitation data - Oswego Snow Network	Microfiche	At NCC	YC
		12.	Radar data hourly precipitation amounts (by storm)	Mag Tape	May 1976	YC
		13.	Avg. daily precip.,eastern Lake Ontario	Microfiche	At NCC	YC
		14.	Collection and Analyses of Digitized Radar Data - Report	Microfiche	At NCC	YC
		15.	Final Report	Microfiche	May 1976	YC
70	Wiesnet		Aerial Hydrological Survey			
		7.	Final Report	Microfiche	At NCC	YC
74	Sykes		Snow Observation Network			
		1.	Documentation	Microfiche	Oct 1975	YC
		2.	Rain Gage Charts - 13 locations	Microfilm	At NCC	Y
		3.	Student observation forms	5000 Pages	Now	PI
		4.	Replications of Ice Crystals	Slides	Now	PI
		5.	Photo of flakes, crystal types	Film	Now	PI
		6.	Final Report I. Oswego Weather Radar Project 1972/1973	Microfiche	At NCC	YC
		7.	Final Report II. Precipitation Gages plus Snowfall	Microfiche	At NCC	YC
		8.	Final Report III.Supp. Study 1973/1974	Microfiche	At NCC	YC
	PANEL		WATER MOVEMENT			
27	Liu		Waverider Buoy			
		3.	Digitized wave data(3 samples/second)	Mag Tape	At NCC	Y
		5.	Hourly summary and plot of digitized wave data	Microfilm	At NCC	YC
		6.	Final Report	Microfiche	At NCC	YC
34	Mortimer		Internal Waves - Temperature Transect			
		5.	Temperature Transects	Microfilm	Oct 1975	YC
		6.	Final Report	Microfiche	Oct 1975	YC
37	Pandolfo		Simulation Studies			
		1.	Volume I - Final Report	Microfiche	At NCC	YC
		2.	Volume II - FORTRAN Program	Microfiche	At NCC	YC
		3.	Volume III - One-Dimensional Model	Microfiche	At NCC	YC
		4.	Volume IV - 3-Dimensional Model	Microfiche	At NCC	YC
49	Rao		Lake Circulation			
		1.	Final Report	Microfiche	June 1976	YC

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		WATER MOVEMENT (Cont'd)			
55	Saylor		Lagrangian Current Observations			
		1.	Current drogue - Daily plot	Microfilm	May 1976	YC
		2.	Water temperature - Daily chart	Microfiche	May 1976	YC
		5.	Final Report	Microfiche	May 1976	YC
56	Saylor		Circulation - Currents			
		2.	Current/Wind daily charts	Microfilm	Now	PI
		3.	Final Report	Microfiche	July 1976	YC
59	Scott		Coastal Chain			
		1.	Current Meter Data, Water Temperature	Mag Tape	At NCC	YC
		2.	Final and Basic Data Report	Microfiche	At NCC	YC
72	Csanady		Coastal Circulations			
		1.	Final Report	Microfiche	June 1976	YC
77	Pickett		Physical Lake Properties			
		1.	Current, temperature analysis	Microfiche	Dec 1976	YC
		2.	Final Report	Microfiche	Dec 1976	YC
	PANEL		MAJOR SYSTEMS			
50	Rasmusson		Atmospheric Water Balance			
		1.	Heat and Water Budget Computations	Microfiche	June 1976	YC
		2.	Final Report	Microfiche	June 1976	YC
100	CEDDA		Physical Data Collection System			
		1.	Basic data-engineering counts	Mag Tape	At NCC	YC
		2.	Provisional Meteorological and Limnological data (6 Minute)	Mag Tape	At NCC	YC
		3.	-Data Listing	Microfilm	At NCC	YC
		4.	-Time Series Graphics	Microfilm	At NCC	YC
		5.	Final Meteorological & Limnological Data (6 Minute)	Mag Tape	At NCC	YC
		6.	Data Listing of 6 Minute Observations and Hourly Averages	Microfilm	At NCC	YC
		7.	-Time Series Graphics (6 Minute)	Microfilm	At NCC	YC
		8.	-Hourly Average tapes	Mag Tape	At NCC	YC
		9.	Station event logs and histories	Microfilm	At NCC	Y
		10.	System documentation	Microfiche	Dec 1975	YC
		11.	Calibration data	Microfilm	At NCC	Y
		13.	Manual edited data	Mag Tape	At NCC	T
		14.	Sensor Calibrations	Mag Tape	At NCC	T
		15.	Translated cassette data	Mag Tape	At NCC	T
		16.	Rochester Control Center back up tapes	Mag Tape	At NCC	T
		17.	Pre-provisional time series plots	Microfilm	At NCC	T
		18.	Met. Data-Canadian and U.S. Buoys	Mag Tape	At NCC	Y
		19.	Precipitation sensor evaluation	Microfiche	At NCC	YC
101	CEDDA		US IFYGL Ship System-RESEARCHER			
		3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
		4.	EBT On-station data, 6-minute total radiation, Decibar average Subsurface data, 6-minute average data	Mag Tape	At NCC	YC
		5.	DAS Documentation, Calibration, Bridge event logs	Pages	At NCC	T
		6.	DAS Documentation, Logs, and Traces	Microfilm	At NCC	T
		7.	Radiation data and 6 minute averages--Time Series Graphics	Microfilm	Oct 1975	YC

December 9, 1975

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	MAJOR SYSTEMS (Cont'd)			
101	(Cont'd) 8.	Manual observations - raw	Pages	At NCC	T
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	10.	Quality Control Strip Charts	Strip Ch.	Now	T
	11.	9-Point digitized EBT	Mag Tape	At NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	Oct 1975	Y
	14.	EBT Graphics	Microfilm	At NCC	Y
	15.	1-Second Data Listing	Microfilm	At NCC	T
	16.	RESEARCHER Dissolved oxygen traces	Microfilm	At NCC	Y
	17.	Barograph charts	Microfiche	At NCC	YC
	18.	Processing documentation	Microfiche	Dec 1975	YC
	19.	XBT data	Microfilm	At NCC	Y
	20.	XBT data - digitized at NODC	Mag Tape	At NCC	YC
	21.	System manuals	Pages	At NCC	T
	22.	Navigation plots and graphics	Charts	At NCC	T
	23.	DAS Tapes	Mag Tape	At NCC	T
102	CEDDA	US IFYGL Ship System-ADVANCE II			
	3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
	4.	EBT On-station data, 6 minute total radiation, Decibar average Subsurface) data, 6-minute average data	Mag Tape	At NCC	YC
	5.	DAS Documentation, Calibration, Bridge event logs	Microfilm	At NCC	T
	6.	DAS Documentation, Logs, and Traces	Microfilm	At NCC	T
	7.	Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	Oct 1975	YC
	8.	Manual observations-raw	Pages	At NCC	T
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	10.	Quality Control Strip Charts	Strip Ch.	Now	T
	11.	9-Point digitized EBT	Mag Tape	At NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	Oct 1975	Y
	14.	EBT Graphics	Microfilm	At NCC	Y
	15.	1 sec. data listing	Microfilm	At NCC	T
	16.	Processing documentation	Microfiche	Dec 1975	YC
	17.	Navigation plots	Charts	At NCC	T
103	CEDDA	Rawinsonde			
	2.	Raw rawinsonde data copy of data tapes	Mag Tape	At NCC	T
	3.	Raw data-Met. parameters	Strip Ch.	At CEDDA	T
	4.	Raw Data Time Series Plots	Microfilm	At NCC	Y
	5.	Final data - 5 Second Averages	Mag Tape	At NCC	Y
	6.	Final data - 10 Millibar Increments	Mag Tape	At NCC	YC
	7.	Final data - 50 Millibar Increments	Mag Tape	At NCC	YC
	8.	Adiabatic charts and listings	Microfilm	At NCC	YC
	10.	Processing document	Microfiche	Dec 1975	YC
	11.	Down Track Trace	Mag Tape	Now	PI
	13.	Documentation and basic information	Microfilm	At NCC	Y
	15.	Unedited, unpacked, raw data	Mag Tape	At NCC	T
110	EPA	STORET Data			
	1.	Jan. 1975 Dump-Fiche	Microfiche	At NCC	TC
	2.	Jan. 1975 Dump-Film	Microfilm	At NCC	TC
	3.	Final data - Microfiche	Microfiche	At NCC	YC
	4.	Jan. 1975 Dump-Tape	Mag Tape	At NCC	T
	5.	Final data - Tape	Mag Tape	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	MAJOR SYSTEMS (Cont'd)			
118	IFYGL	Miscellaneous IFYGL Reports			
	1.	Technical Plan	Microfiche	At NCC	YC
	2.	Bulletin	Microfiche	At NCC	YC
	3.	Technical Manual Series	Microfiche	At NCC	YC
	4.	Scientific Series	Microfiche	.	YC
	5.	Two Nations, One Lake	Microfiche	At NCC	YC
	6.	Proceedings, IFYGL Symposium, AGU	Microfiche	At NCC	YC
	7.	First Annual Report, EPA	Microfiche	At NCC	YC
119	Robertson	IFYGL Intercomparisons			
	1.	Intercomparison Data & Methods	Microfiche	Dec 1975	YC
	2.	Final Report	Microfiche	Dec 1975	YC
	PANEL	SUPPLEMENTARY DATA			
200	NCC/NOAA	Hourly Surface Aviation			
	1.	Surface Weather Observations-Forms	Paper	Now	PI
	2.	Surface Weather Observations-Digitized	Mag Tape	Now	PI
	3.	Surface Weather Observations-Film	Microfiche	Now	PI
205	NCC/NOAA	Synoptic Observations			
	1.	Original 3 & 6-Hrly. Synoptic Obs.	Paper	Now	PI
	2.	Original 3 & 6-Hrly. Synoptic Obs., Film	Microfilm	Now	PI
210	NCC/NOAA	Daily Co-op Observations			
	1.	Record of Climatological Obs.	Paper	Now	PI
	2.	Record of Climatological Obs.,Digitized	Mag Tape	Now	PI
215	NCC/NOAA	Climatic Summaries			
	1.	Local Climatological Data	Paper	Now	PI
	2.	Prel. Local Climatological Data	Paper	Now	PI
	3.	Climatological Data	Paper	Now	PI
	4.	Summary of the Day Listing	Paper	Now	PI
220	NCC/NOAA	Ships of Opportunity			
	1.	Great Lakes Vessel Reporting Form	Paper	Now	PI
	2.	Great Lakes Vessel Reporting Form-Digitized	Mag Tape	Now	PI
225	NCC/NOAA	RADAR Observations			
	1.	RADAR Log	Paper	Now	PI
	2.	RADAR Film (Also see Task 69TW)	Microfilm	Now	PI
230	NCC/NOAA	Station History/Instrumentation			
	1.	NWS Station Description Forms	Paper	Now	PI
235	NCC/NOAA	Solar Radiation			
	1.	Hourly/Daily Digitized Data	Mag Tape	Now	PI
	2.	Hourly/Daily Forms	Paper	Now	PI
	3.	Hourly/Daily Instrument Charts	Charts	Now	PI
240	NCC/NOAA	Recorder Charts			
	1.	Gust Recorder	Paper	Now	PI
	2.	Triple Register	Paper	Now	PI
	3.	Barograms	Paper	Now	PI
	4.	Rain Gage	Paper	Now	PI
	5.	Rain Gage	Mag Tape	Now	PI
245	NCC/NOAA	Analyzed Maps/Charts			
	1.	NMC Charts	Microfilm	Now	PI
	2.	NMC Charts	Paper	Now	PI

Table 9.--Summary of data available from final IFYGL Archive: United States (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	MAJOR SYSTEMS (Cont'd)			
261	NCC/NOAA	Lake Data			
	1.	Monthly Bulletin of Lake Levels	Report	Now	PI
	2.	Great Lakes Water Levels	Report	Now	PI
280	NCC/NOAA	Other			
	1.	Aerial Photographs of Rochester	Prints	Now	PI

Table 10.--Summary of data available from final IFYGL Archive: Canada

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	ATMOSPHERIC BOUNDARY LAYER			
5	Donelan	Direct Measurement of Energy Fluxes			
	1.	Niagara Bar Micromet Data-10 min.	Mag Tape	At NCC	Y
	2.	30-Min Ave. radiation & water level	Microfilm	At NCC	Y
	3.	Determination of Aerodynamic Drag Coefficient	Microfiche	Dec 1975	Y
15	McBean	Space Spectra in the Free Atmosphere			
	1.	Mesoscale low-level flight data	Mag Tape	At NCC	Y
	2.	Mesoscale low-level flight data	Microfiche	At NCC	Y
28	McBean	Momentum, Heat, & Moisture Transfer			
	1.	Niagara Bar Micromet data	Microfiche	At NCC	Y
44	Elder	Analysis of Energy Fluxes			
	2.	Preliminary estimates	Microfiche	At NCC	Y
	3	Preliminary Energy Budget	Microfiche	At NCC	Y
	4.	Preliminary investigation of wind stress field over Lake Ontario	Microfiche	At NCC	Y
75	Smith	Wind & Temperature Fluctuations			
	1.	Niagara Bar preliminary data	Microfiche	At NCC	Y
	2.	Niagara Bar final data	Microfiche	At NCC	Y
	3.	Report-Eddy Flux Measurements	Microfiche	At NCC	Y
97	Elder	Meteorological Buoy Measurements			
	1.	10-min observational data & 1 hour averaged data	Mag Tape	At NCC	Y
	2.	Prelim Invest-Wind Stress Field	Microfiche	At NCC	Y
	3.	Field Report	Microfiche	At NCC	Y
	4.	Summary of Met. Buoy & Manual Measurements	Microfiche	At NCC	Y
	5.	A Met. Buoy System for Great Lakes Studies	Microfiche	At NCC	Y
	6.	Listings	Microfilm	At NCC	Y
107	Shaw	Air Pollution Sinks			
	1.	Sulphate deposition by precipitation	Microfiche	At NCC	Y
	PANEL	BIOLOGY - CHEMISTRY			
54	Gorman	Groundwater Supply Near Kingston			
	1.	Geochemical Study of Deadman Bay	Microfiche	At NCC	Y
81	Salbach	Material Balance Lake Ontario			
	1.	Water quality info - preliminary	Microfiche	At NCC	Y
	2.	Water quality data - tributary streams	Microfiche	At NCC	Y
82	Watson	Lake Ontario Zooplankton Migration			
	1.	Energetics of Vert. Migration	Microfiche	At NCC	Y
	2.	Distribution data	Mag Tape	Dec 1975	Y
	3.	Field Nutrient Excretion	Microfiche	Dec 1975	Y
83	Christie	Cooperative Studies of Fish Stocks			
	1.	Times, locations of trawl drags	Microfiche	At NCC	Y
	2.	Effects on the Salmonid Community	Microfiche	At NCC	Y
	3.	Changes in Fish Species Composition	Microfiche	At NCC	Y
84	Owen	Cladophora Growth			
	1.	Location and Extent of Cladophora	Microfiche	Dec 1975	Y
85	Frazer	Nutrient Cycles, Lake Ontario			
	1.	Phosphorus & Nitrogen Transects	Microfiche	At NCC	Y

Table 10.--Summary of data available from final IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	BIOLOGY - CHEMISTRY (Cont'd)			
86	Nicholson	Lake Ontario Surface Plankton Survey			
	1.	Pigment Analysis: Chlorophyll "A"	Microfiche	At NCC	Y
98	Carpenter	Lake Ontario Cross-Section Study			
	2.	Abundance of Diatoms, SW Nearshore	Microfiche	At NCC	Y
101	Munawar	Lake Ontario Primary Production Study			
	1.	Measurement and Prediction	Microfiche	At NCC	Y
	2.	Primary production at an Inshore & Offshore Station	Microfiche	At NCC	Y
	3.	Final Report-Biomass Parameters and Primary Production	Microfiche	Aug 1975	Y
102	Glooschenko	Lake Ontario Diel Pigment Variation			
	1.	Diel Chlorophyll "A" Variations	Microfiche	At NCC	Y
103	Gilbertson	Pesticide Concentration in Birds' Eggs			
	1.	Seasonal Changes, Terns, Hamilton	Microfiche	At NCC	Y
104	Shiomi	Rain Quality Monitoring			
	1.	Composition of Precipitation	Microfiche	Dec 1975	Y
	PANEL	ENERGY BALANCE			
8	Robertson	Shore Gauging Stations			
	1.	Hourly averaged water temperature	Mag Tape	At NCC	Y
	2.	Key Punch Card Documentation	Microfiche	At NCC	Y
	3.	Documentation of System	Microfiche	Dec 1975	Y
32	Rodgers	Thermal Bar Study			
	1.	Energy Budget Study	Microfiche	At NCC	Y
42	Boyce	Heat Storage of Lake Ontario			
	1.	Heat Content Survey Report #1	Microfiche	At NCC	Y
	2.	Heat Content Survey Report #2	Microfiche	At NCC	Y
	3.	Heat Content Survey Report #3	Microfiche	At NCC	Y
	4.	Heat Content Survey Report #4	Microfiche	At NCC	Y
	5.	Heat Content Survey Report #5	Microfiche	At NCC	Y
	6.	Heat Content Survey Report #6	Microfiche	At NCC	Y
	7.	Heat Content Survey Report #7	Microfiche	At NCC	Y
	8.	Heat Content Survey Report #8	Microfiche	At NCC	Y
	9.	Heat Content Survey Report #9	Microfiche	At NCC	Y
	10.	Heat Content Survey Report #10	Microfiche	At NCC	Y
	11.	Final Report	Microfiche	Jan 1976	Y
	12.	River Flows and Temperature Inputs to Lake Ontario	Mag Tape	At NCC	Y
71	Latimer	Canadian Radiation Network			
	1.	AES radiation data-see Task 80			
	3.	Instrument Location & Obstruction Charts	Microfiche	At NCC	Y
72	Ramseier	Floating Ice Research			
	1.	Navigation Season Extension Studies	Microfiche	At NCC	Y
	2.	Studies, Extension of Winter Nav.	Microfiche	At NCC	Y
73	Judge	Terrestrial Heat Flow			
	1.	Analysis of Heat Data	Microfiche	At NCC	Y
	2.	Mud Temperature Gradient	Microfiche	March 1976	Y
	3.	Thermal Conductivity of Lake Ontario	Microfiche	March 1976	Y

Table 10.--Summary of data available from final IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	ENERGY BALANCE (Cont'd)			
80	Davies	Radiation Balance Program			
	1.	Radiation data	Mag Tape	At NCC	Y
	3.	Final Report, Canadian Radiation	Microfiche	At NCC	Y
87	Boyce	Heat Flow to Lake Ontario			
		Included in Task 42 EB	Microfilm	Oct 1973	Y
	PANEL	FIELD SUPPORT			
1	Thomson	Remote Sensing			
	1.	Lake Dynamics Utilizing Sun-Glint	Microfiche	At NCC	Y
	2.	High Altitude Remote Sensing	Microfiche	At NCC	Y
	3.	Optical Properties of the Great Lakes	Microfiche	At NCC	Y
30	Rodgers	IFYGL Operations - CCGS PORTE DAUPHINE			
	1.	Digitized Shipboard Data - EBT	Mag Tape	At NCC	Y
		A. Conductivity of Surface Water			Y
		B. Chlorophyll samples			Y
		C. Hourly weather data			Y
		D. Radiation data			Y
	6.	Shipboard data	Microfilm	At NCC	Y
68	CCIW	CCIW Supporting Resources			
	1.	Shipboard data - STAR Format	Mag Tape	At NCC	Y
	2.	Description of STAR System	Microfiche	.	Y
	3.	TSAR Format Documentation	Paper	At NCC	T
	4.	Shipboard EBT data	Mag Tape	At NCC	Y
	5.	Star Monitor Layout	Paper	At NCC	T
	6.	Shipboard data	Microfilm	At NCC	Y
79	McCulloch	Bathymetric Surveys - Lake Ontario			
	1.	Lake Ontario Bathymetric data	Mag Tape	At NCC	Y
94	MacPhail	Data Retransmission by Satellites			
	1.	Data retransmission	Microfiche	At NCC	Y
118	CCIW	Publications			
	1.	Plan of Study for IFYGL	Microfiche	At NCC	Y
	2.	Objective Analysis Surface Pressure	Microfiche	At NCC	Y
	3.	Numerical Models of Airflow	Microfiche	At NCC	Y
	4.	1971 Buoy Intercomparison	Microfiche	At NCC	Y
	5.	Canadian Projects & Supplements 1-4	Microfiche	At NCC	Y
	6.	Canadian IFYGL Data Submissions 7/31/74	Microfiche	At NCC	Y
	7.	Intercomparison - Research Aircraft	Microfiche	At NCC	Y
	8.	Hydrometeorological Studies	Microfiche	At NCC	Y
	9.	The IFYGL Field Year	Microfiche	At NCC	Y
250	IFYGL	Weather Summaries			
	1.	IFYGL "WEATHER DATA" Monthly	Microfiche	At NCC	Y
	PANEL	LAKE METEOROLOGY & EVAPORATION			
16	Irbe	Airborne Radiation Thermometer Surveys			
	1.	Airborne Radiation thermometer maps	Microfiche	At NCC	Y
18	McCulloch	Climatological Network			
	1.	Monthly record Canadian Met. data	Report	At NCC	T
	2.	1972 Ship data - all Lakes	Mag Tape	At NCC	Y
	4.	Hourly Weather data	Mag Tape	At NCC	Y

Table 10.--Summary of data available from final IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	LAKE METEOROLOGY & EVAPORATION (Cont'd)			
20	McCulloch	Bedford Tower Program			
	1.	Bedford Tower Met. data	Mag Tape	July 1976	Y
21	McCulloch	Canadian Shoreline Network			
	1.	Met. data: Shoreline Stations	Mag Tape	At NCC	Y
22	McCulloch	Synoptic Studies			
	1.	Synoptic Studies Analysis	Microfiche	Dec 1977	Y
23	Pollock	Precipitation in Canada			
	1.	Daily gridpoint values of prec.	Mag Tape	At NCC	Y
	2.	Distrometer & rain gauge data	Mag Tape	At NCC	Y
24	Phillips	Climatological Studies			
	1.	IFYGL Weather Highlights	Microfiche	At NCC	Y
	2.	Surface Weather Maps	Microfilm	At NCC	Y
25	Irbe	Lake Ontario Evaporation by Mass Transfer			
	1.	Monthly estimates	Microfiche	At NCC	Y
27	McCulloch	Island Precipitation Network			
	1.	Supplementary Precipitation data	Microfiche	At NCC	Y
64	Ferguson	Basin Evapotranspiration			
	1.	Monthly maps of Evapotranspiration	Microfiche	Dec 1975	Y
65	McCulloch	Evaporation Pan Network			
	1.	Evaporation Pan Documentation	Microfiche	At NCC	Y
66	Ferguson	Atmospheric Water Balance Study			
	1.	Atmospheric Water Balance	Microfiche	At NCC	Y
67	Webb	Surface Water Temperature Distribution			
	1.	Mean Monthly Temperatures	Microfiche	At NCC	Y
117	McCulloch	APT Photographs			
	1.	ESSA 8 APT photographs	Microfilm	At NCC	Y
	PANEL	TERRESTRIAL WATER BALANCE			
11	Witherspoon	Monthly Water Balance-Lake Ontario Basin			
	1.	Hydrologic Model of the Basin	Microfiche	Dec 1975	Y
	2.	Storage in the Water Balance	Microfiche	Dec 1975	Y
12	Witherspoon	Monthly Water Balance of Lake Ontario			
	7.	An Estimate of Water Balance	Microfiche	At NCC	Y
	8.	Preliminary Lake Ontario Water Balance	Microfiche	At NCC	Y
	9.	General Water Balance of Lake Ontario	Microfiche	At NCC	Y
13	Ryckborst	Groundwater Flow Into Lake Ontario			
	1.	Groundwater Flow Simcoe and Ontario	Microfiche	At NCC	Y
	2.	Groundwater Inflow Canadian Side	Microfiche	At NCC	Y
14	Russell	Hydrology of Lake Ontario			
	1.	Tributary data	Microfiche	At NCC	Y
	2.	Daily discharge	Mag Tape	At NCC	Y
38	Ostry	Groundwater Contribution			
	1.	Observation wells	Microfiche	At NCC	Y
	2.	Snow courses	Microfiche	Sept 1975	Y
	3.	Soil moisture	Microfiche	Dec 1975	Y

Table 10.--Summary of data available from final IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		TERRESTRIAL WATER BALANCE (Cont'd)			
38	(Cont'd)	4.	Overburden well yields	Microfiche	At NCC	Y
		5.	Hydrology of Forty Mile Creek	Microfiche	At NCC	Y
		6.	Bedrock well yields	Microfiche	At NCC	Y
		7.	Groundwater chemistry-Forty Mile Creek	Microfiche	At NCC	Y
		8.	Surficial geology,N. Shore-Newcastle	Microfiche	At NCC	Y
		9.	Hydrogeology-Bowmanville,Newcastle	Microfiche	At NCC	Y
46	MacDonald		St. Lawrence-Niagara Riv.Measuring Prog.			
		1.	Inflow measurements	Microfiche	At NCC	Y
49	Adams		Snow Stratigraphy and Distribution			
		1.	Peterborough Area: Met. data	Microfiche	Dec 1975	Y
		7.	Peterborough Area: Snow data	Microfiche	At NCC	Y
69	Henderson		Pleistocene Mapping			
		1.	Maps and charts	Microfiche	June 1976	Y
74	Dohler		Water Level Network			
		1.	Port Weller(Last of period not received yet)	Mag Tape	Part At NCC	Y
		2.	Toronto	Mag Tape	Part At NCC	Y
		3.	Burlington	Mag Tape	Part At NCC	Y
		4.	Cobourg	Mag Tape	Part At NCC	Y
		5.	Point Petre	Mag Tape	Part At NCC	Y
		6.	Kingston	Mag Tape	Part At NCC	Y
		7.	Format Hrly Header & Monthly Cards	Paper	At NCC	Y
		8.	Water levels	Mag Tape	At NCC	Y
116	Loijens		Airborne Gamma-Ray Snow Survey			
		1.	Snow-Water Equivalent	Microfiche	At NCC	Y
		2.	Experimental Snow Survey	Microfiche	At NCC	Y
		3.	Comparison of Water Equivalent	Microfiche	At NCC	Y
	PANEL		WATER MOVEMENT			
34	Rodgers		Circulation Near Toronto			
		1.	Tower current speed & direction water temperature	Mag Tape	Availability uncertain	Y
40	Csanady		Coastal Chain Study			
		1.	Provisional Reports	Microfiche	At NCC	Y
		2.	Final Report	Microfiche	At NCC	Y
		4.	Daily Summary - Presquile	Pun'd Cards	At NCC	T
		5.	Daily Summary - Oshawa	Pun'd Cards	At NCC	T
		6.	Daily Summary: Presquile & Oshawa	Mag Tape	At NCC	Y
		7.	Baroclinic Coastal Jets	Microfiche	At NCC	Y
43	Boyce		Internal Wave Measurements			
		1.	Transect cross section	Microfiche	Dec 1976	Y
		2.	Fixed Temperature Profiler (FTP) data	Not Known	Dec 1976	Y
		3.	Transect tape	Mag Tape	Sept 1975	Y
		4.	FTP data file	Mag Tape	Sept 1975	Y
		5.	Transect tapes	Mag Tape	Sept 1975	Y
45	Bennett		Lake Current Measurements			
		2.	10 minute current temperature data	Mag Tape	At NCC	Y
		3.	Final Report	Microfiche	Dec 1976	Y
		4.	10 minute current data listing	Microfilm	At NCC	Y
70	Falconer		Ground Truth for Remote Sensing			
		1.	Analysis of ERTS and Aircraft data	Microfiche	Sept 1975	Y
		2.	Flight Line Maps	Microfiche	At NCC	Y

Table 10.--Summary of data available from final IFYGL Archive: Canada (Continued)

TASK NO.	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	WATER MOVEMENT (Cont'd)			
76	Holland	Surface Wave Studies			
	1.	Final Report - Wave Climate Study	Microfiche	Unknown	Y
	2.	Wave Climate Data - Cobourg	Mag Tape	At NCC	Y
	4.	Wave Climate Data-Main Duck Island	Mag Tape	At NCC	Y
	5.	Equiv. Wave Heights vs. Period, 3 Stns.	Microfiche	At NCC	Y
	8.	Wave Climate Data - Toronto	Mag Tape	At NCC	Y
	10.	Format for Wave Climate Study	Microfiche	At NCC	Y
89	Murthy	Turbulent Diffusion Studies			
	1.	Large Scale Diffusion Studies	Microfiche	At NCC	Y
	2.	Nearshore Diffusion Studies	Microfiche	At NCC	Y
	3.	Lagrangian and Current Measurements	Microfiche	At NCC	Y
	4.	Diffusion in Thermocline & Hypolimnion regions	Microfiche	At NCC	Y
	5.	Dispersion of Floatables	Microfiche	At NCC	Y
	6.	Observations of Lateral Shear	Microfiche	At NCC	Y
95	Simons	Hydrodynamical Modelling			
	6.	First Report: Model Study of Agnes	Microfiche	At NCC	Y
	7.	Model Study of Betty Storm	Microfiche	At NCC	Y
	8.	Development of Numerical Models	Microfiche	At NCC	Y
	9.	Development of Numerical Models Part 2	Microfiche	At NCC	Y
	10.	3 Dimensional Models	Microfiche	At NCC	Y
	11.	Obs. & Computed Current-Hurricane Agnes	Microfiche	At NCC	Y
	12.	Hydrodynamical Modelling Studies	Microfiche	At NCC	Y
	13.	Verification of Numerical Models Part 1	Microfiche	At NCC	Y
109	Rodgers	Upwelling Study			
	1.	Water Temp. (EBT): Included in Task 30			
110	Arajs	Hydro Intake Study			
	1.	Water current & temp.: Chub Point, Bowmanville, Weoleyville, Pickering and Lennox	Mag Tape	At NCC	Y
	2.	Nearshore Currents and Temperatures Pickering-Cobourg	Microfiche	At NCC	Y
111	Palmer	Lakeview Dispersion Study			
	1.	Current Meter Data - Lakeview	Mag Tape	At NCC	Y
	2.	Current Meter Data - Lorne Park	Mag Tape	At NCC	Y
115	Cho	Wave Climatology			
		Manual Records at CCIW			

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